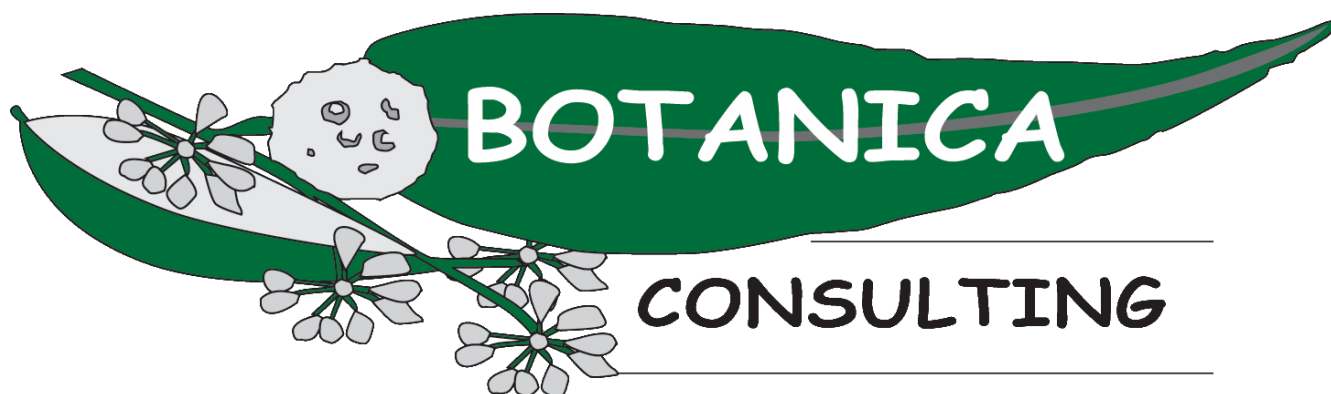




Flora & Vegetation Survey of the Greater Flying Fox Area

Tenements: M77/582, M77/911 and M77/545

Prepared For

WESTERN AREAS NL



Final Report
January 2013

Prepared by:
Botanica Consulting
PO Box 2027
Boulder WA 6432
90930024

Disclaimer

This document and its contents are to be treated as confidential and are published in accordance with and subject to an agreement between Botanica Consulting (BC) and the client for whom it has been prepared and is restricted to those issues that have been raised by the client in its engagement of BC. Neither this document nor its contents may be referred to or quoted in any manner (report or other document) nor reproduced in part or whole by electronic, mechanical or chemical means, including photocopying, recording or any information storage system, without the express written approval of the client and/or BC.

This document and its contents have been prepared utilising the standard of care and skill ordinarily exercised by Environmental Scientists in the preparation of such documents. All material presented in this document is published in good faith and is believed to be accurate at the time of writing. Any person or organisation who relies on or uses the document and its contents for purposes or reasons other than those agreed by BC and the client without primarily obtaining the prior written consent of BC, does so entirely at their own risk. BC denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be endured as a consequence of relying on this document and its contents for any purpose other than that agreed with the client.

Quality Assurance

An internal quality review process has been implemented to each project task undertaken by BC. Each document and its contents is carefully reviewed by core members of the Consultancy team and signed off at Director Level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Document Job Number: 2012/41

Prepared by: Lauren Pick
Environmental Consultant
Botanica Consulting

Samantha Stapleton
Environmental Consultant
Botanica Consulting

Reviewed by: Andrea Williams
Director
Botanica Consulting

Approved by: Jim Williams
Director
Botanica Consulting

Index	Page #
1 Introduction.....	1
1.1 Project Description.....	1
1.2 Flora and Vegetation within the Greater Flying Fox area.....	2
1.3 Previous relevant flora surveys.....	3
2 Regional Biophysical Environment.....	8
2.1 Regional Environment.....	8
2.2 Conservation Areas.....	9
2.3 Topography & Soils.....	12
2.4 Vegetation.....	12
2.5 Climate.....	13
2.6 Land Use.....	14
2.7 Survey Objectives.....	14
3 Survey Methodology.....	15
3.1 Desktop Assessment.....	15
3.2 Sampling and Analysis Methods.....	16
3.2.1 Personnel involved.....	18
3.2.2 Scientific licences.....	18
3.3 Data Analysis Tools.....	18
3.4 Flora survey limitations and constraints.....	18
4 Results.....	20
4.1 Summary.....	20
4.2 Desktop Assessment.....	21
4.3 Conservation Significant Flora Species.....	25
4.3.1 <i>Baekkea</i> sp. North Ironcap (R.J. Cranfield 10580) (P2).....	26
4.3.2 <i>Baekkea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3).....	27
4.3.3 <i>Boronia westringioides</i> (P2).....	28
4.3.4 <i>Daviesia elongata</i> subsp. <i>implexa</i> (P3).....	29
4.3.5 <i>Dillwynia acerosa</i> (P3).....	30
4.3.6 <i>Eutaxia acanthoclada</i> (P3).....	31
4.3.7 <i>Microcorys</i> sp. Forrestania (V. English 2004) (P4).....	32
4.3.8 <i>Verticordia mitodes</i> (P3).....	33
4.4 Fauna of Conservation Significance.....	34
4.5 Vegetation Communities.....	34
4.6 Open shrub mallee of <i>Eucalyptus eremophila</i> and <i>Eucalyptus pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	35
4.6.1 Flora.....	35
4.6.2 Vegetation.....	36
4.7 Heath of mixed <i>Acacia/Allocasuarina/Melaleuca</i>	37
4.7.1 Flora.....	37
4.7.2 Vegetation.....	37
4.8 Open shrub mallee of <i>Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides</i> over low heath of mixed <i>Melaleuca</i>	39
4.8.1 Flora.....	39
4.8.2 Vegetation.....	39
4.9 Low woodland of <i>Eucalyptus salmonophloia</i> over low scrub of mixed <i>Melaleuca</i>	40
4.9.1 Flora.....	40
4.9.2 Vegetation.....	41
4.10 Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub.....	42
4.10.1 Flora.....	42
4.10.2 Vegetation.....	42
4.11 Low woodland of <i>Eucalyptus salmonophloia</i> over mallee of <i>Eucalyptus cylindrocarpa/Eucalyptus cylindriflora/Eucalyptus pileata</i>	44
4.11.1 Flora.....	44
4.11.2 Vegetation.....	44
4.12 Heath of <i>Melaleuca hamata/Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	45
4.12.1 Flora.....	45
4.12.2 Vegetation.....	45
4.13 Regrowth forest of <i>Eucalyptus salmonophloia/Eucalyptus salubris</i> over heath of <i>Melaleuca cucullata/Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis/Acacia acanthoclada</i>	47
4.13.1 Flora.....	47
4.13.2 Vegetation.....	47

4.14	Low woodland of <i>Eucalyptus polita</i> / <i>Eucalyptus platycorys</i> / <i>Eucalyptus horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	48
4.14.1	Flora	48
4.14.2	Vegetation	48
4.15	Open tree mallee of <i>Eucalyptus eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise	50
4.15.1	Flora	50
4.15.2	Vegetation	50
4.16	Vegetation of Conservation Significance	51
4.17	Vegetation condition.....	53
4.18	Introduced Plant Species	54
5	Relevant Legislation and Compliance with Recognised Standards	55
5.1	Commonwealth Legislation	55
5.2	State Legislation	55
5.3	EPA Position Statements	57
5.4	Native Vegetation Clearing Principles.....	58
6	Conclusions and Recommendations	60
6.1	Conclusions.....	60
6.2	Recommendations	61
7	References	62
8	Appendices.....	65

Tables

Table 1:	Summary of flora and vegetation recorded within the Greater Flying Fox area	2
Table 1:	Pre-European Beard Vegetation Associations within the survey area (DAFWA, 2011)	13
Table 3:	Definitions of Rare and Priority Flora Species (WAHERB, 2011).	15
Table 3:	Scientific licenses of Botanica staff coordinating the Spring 2012 survey	18
Table 5:	Limitations and constraints associated with the Spring 2012 survey.	19
Table 6:	Priority Flora with the potential to occur within the Greater Flying Fox area (WAHERB, 2012)	22
Table 7:	Summary of Vegetation Communities and their areas	35
Table 8:	Vegetation assemblage for Open shrub mallee of <i>Eucalyptus eremophila</i> and <i>Eucalyptus pileata</i> over low heath of mixed <i>Acacia</i> / <i>Melaleuca</i> within the survey area (Muir, 1977)	36
Table 9:	Vegetation assemblage for Heath of mixed <i>Acacia</i> / <i>Allocasuarina</i> / <i>Melaleuca</i> within the survey area (Muir, 1977)	38
Table 10:	Vegetation assemblage for Open shrub mallee of <i>Eucalyptus eremophila</i> / <i>Eucalyptus calycogona</i> / <i>Eucalyptus celastroides</i> over low heath of mixed <i>Melaleuca</i> within the survey area (Muir, 1977)	39
Table 11:	Vegetation assemblage for Low woodland of <i>Eucalyptus salmonophloia</i> over low scrub of mixed <i>Melaleuca</i> within the survey area (Muir, 1977)	41
Table 12:	Vegetation assemblage for Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub within the survey area (Muir, 1977).....	43
Table 13:	Vegetation assemblage for Low woodland of <i>Eucalyptus salmonophloia</i> over mallee of <i>Eucalyptus cylindrocarpa</i> / <i>Eucalyptus cylindriflora</i> / <i>Eucalyptus pileata</i> within the survey area (Muir, 1977)	44
Table 14:	Vegetation assemblage for Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i> within the survey area (Muir, 1977)	46
Table 15:	Vegetation assemblage for Regrowth forest of <i>Eucalyptus salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i> within the survey area (Muir, 1977).....	47
Table 16:	Vegetation assemblage for Low woodland of <i>Eucalyptus polita</i> / <i>Eucalyptus platycorys</i> / <i>Eucalyptus horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i> within the survey area (Muir, 1977)	49
Table 17:	Vegetation assemblage for Open tree mallee of <i>Eucalyptus eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise within the survey area (Muir, 1977)	50

Figures

Figure 1:	Tenements within the Greater Flying Fox area	2
Figure 2:	Regional map of the Greater Flying Fox area (survey area not to scale)	1
Figure 3:	IBRA subregions surrounding the Greater Flying Fox area	8
Figure 4:	Map of existing and proposed Conservation Areas (EPA, 2009) in relation to the Greater Flying Fox area	10
Figure 5:	Location map of the Great Western Woodlands (DEC, 2010a).	11
Figure 6:	Monthly rainfall from January 2009 to August 2012 and mean monthly rainfall (September 1905 to August 2012) for the Lake Carmody weather station (#10670) (BOM, 2012)	14
Figure 7:	GPS tracks traversed throughout the Spring 2012 survey	17

Plates

Plate 1: Image of <i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580) (P2).....	26
Plate 2: Image of <i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3)	27
Plate 3: Image of <i>Boronia westringioides</i> (P2).....	28
Plate 4: Image of <i>Boronia westringioides</i> (P2).....	29
Plate 5: Image of <i>Dillwynia acerosa</i> (P3).....	30
Plate 6: Image of <i>Eutaxia acanthoclada</i> (P3)	31
Plate 7: Image of <i>Microcorys</i> sp. Forrestania (V. English 2004) (P4).....	32
Plate 8: Image of <i>Verticordia mitodes</i> (P3)	33
Plate 9: Open shrub mallee of <i>Eucalyptus eremophila</i> and <i>Eucalyptus pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	37
Plate 10: Heath of mixed <i>Acacia/Allocasuarina/Melaleuca</i>	38
Plate 11: Open shrub mallee of <i>Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides</i> over low heath of mixed <i>Melaleuca</i>	40
Plate 12: Low woodland of <i>Eucalyptus salmonophloia</i> over low scrub of mixed <i>Melaleuca</i>	42
Plate 13: Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub.....	43
Plate 14: Low woodland of <i>Eucalyptus salmonophloia</i> over mallee of <i>Eucalyptus cylindrocarpa/ Eucalyptus cylindriflora/ Eucalyptus pileata</i> within the survey area	45
Plate 15: Heath of <i>Melaleuca hamata/Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	46
Plate 16: Regrowth forest of <i>Eucalyptus salubris</i> over heath of <i>Melaleuca cucullata/Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis/Acacia acanthoclada</i>	48
Plate 17: Low woodland of <i>Eucalyptus polita/Eucalyptus platycorys/Eucalyptus horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora/Acacia intricata</i>	49
Plate 18: Open tree mallee of <i>Eucalyptus eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise	51

Appendices

Appendix 1: Regional map of the Greater Flying Fox area including DEC Flora of Conservation Significance locations (area not to scale).....	65
Appendix 2: Regional map of the Greater Flying Fox area including PEC, Lake Cronin ESA & Schedule 1 Area (area not to scale).....	66
Appendix 3: Vegetation map of the Greater Flying Fox area including Flora of Conservation Significance	67
Appendix 4: List of species identified within each vegetation community	68
Appendix 5: DEC Threatened Flora Database search results within 10km of the Greater Flying Fox area (DEC, 2011b)	78
Appendix 6: GPS coordinates of Flora/Fauna of Conservation Significance within the Greater Flying Fox area.....	80
Appendix 7: Muir Life Form/Height Class (Muir, 1977).....	81
Appendix 8: Keighery Health rating scale (1994).	82

Executive Summary

Botanica Consulting was commissioned by Western Areas NL to undertake a Level 1 flora and vegetation survey of the Greater Flying Fox area, located approximately 72km east of Hyden. The Greater Flying Fox area covers an area of approximately 1178ha (including 130ha cleared for mining operation) of which approximately 781ha has been previously surveyed by Botanica Consulting (2006-2008). The remaining 267 ha was surveyed on the 29th of August 2012. The results of previous surveys were combined with the results of the current survey to provide a flora and vegetation assessment of the entire Greater Flying Fox area.

A total of ten vegetation communities were identified within the Greater Flying Fox area:

1. Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia/Melaleuca*;
2. Heath of mixed *Acacia/Allocasuarina/Melaleuca*;
3. Open shrub mallee of *Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides* over low heath of mixed *Melaleuca*;
4. Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca*;
5. Low scrub of mixed *Allocasuarina* over mixed dwarf scrub;
6. Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*, *Eucalyptus cylindriflora* and *Eucalyptus pileata*;
7. Heath of *Melaleuca hamata/Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora*;
8. Regrowth forest of *Eucalyptus salmonophloia/Eucalyptus salubris* over heath of *Melaleuca cucullata/Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis/Acacia acanthoclada*; and
9. Low woodland of *Eucalyptus polita/Eucalyptus platycorys/Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora/Acacia intricata*; and
10. Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise.

These ten vegetation communities were represented by a total of 43 Families, 98 Genera and 278 Species (including sub-species and variants).

No Threatened Flora were recorded within the Greater Flying Fox area, however eight Priority Flora species were identified within the Greater Flying Fox area; *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3), *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2), *Boronia westringioides* (P2), *Daviesia elongata* subsp. *implexa* (P3), *Dillwynia acerosa* (P3), *Eutaxia acanthoclada* (P3), *Microcorys* sp. Forrestania (V. English 2004) and *Verticordia mitodes* (P3).

One of the vegetation communities has National Environmental Significance as defined by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as it contained an inactive *Leipoa ocellata* (malleefowl) mound. Malleefowl are listed as vulnerable under the *Environment*

Protection and Biodiversity Conservation Act 1999. No Threatened Ecological Communities pursuant to Commonwealth legislation or listed by the Department of Environment and Conservation were recorded within the Greater Flying Fox area. The Greater Flying Fox area is however located within the North Ironcap Priority Ecological Community of the *Ironcap Hills Vegetation Complexes* which is listed by the Department of Environment and Conservation as a Priority 3 Ecological Community.

The entire Greater Flying Fox area lies within the Lake Cronin Environmentally Sensitive Area and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the Environmental Protection Authority report (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *Conservation Land Management Act 1984* but not formally reserved.

A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap Banded Ironstone Formation located approximately 5km north-west region of the Greater Flying Fox area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha.

The entire Greater Flying Fox area is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), two of the ten vegetation communities within the Greater Flying Fox area were rated as being in 'good' health. The remaining eight vegetation communities were rated as being in 'very good' health. No introduced species was identified within the Greater Flying Fox area.

1 Introduction

1.1 Project Description

Botanica Consulting (BC) was commissioned by Western Areas NL to undertake a Level 1 flora and vegetation survey of the Greater Flying Fox area. The flora survey was conducted within tenements M77/582, M77/911 and M77/545 (Figure 1). The aim of the survey was to produce a vegetation map (Appendix 3) and species list (Appendix 4) as well as to document and map locations of any Threatened Ecological Communities (TEC), Threatened or Priority Flora species within the survey area. The entire Greater Flying Fox area covers an area of 1178ha (including 130ha cleared for mining operation); approximately 267 ha were surveyed on August 29th 2012 and approximately 781ha was previously surveyed by BC between 2006 and 2008. The results of these previous surveys were combined with the results of the current survey to provide a flora and vegetation assessment of the entire Greater Flying Fox area.

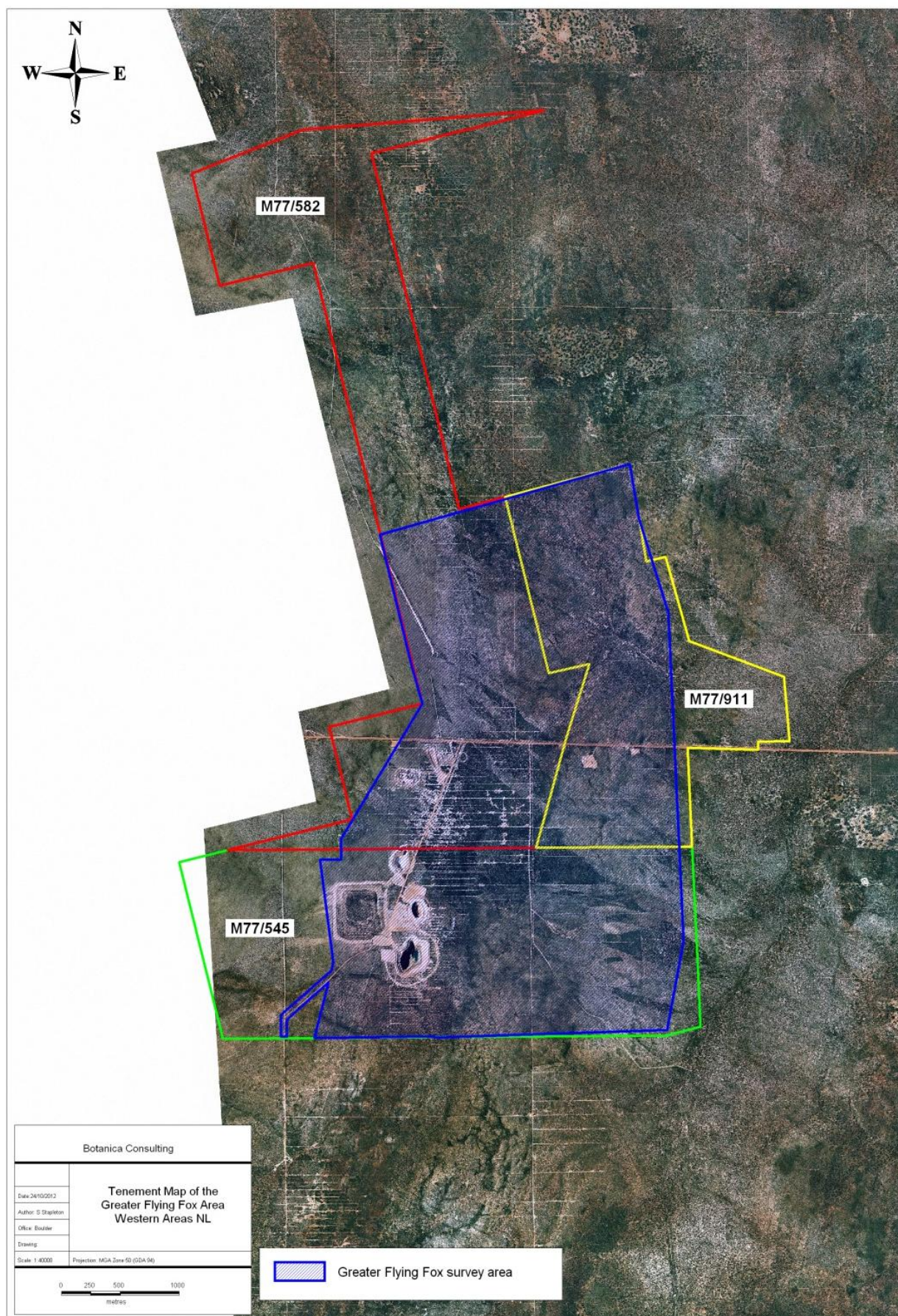


Figure 1: Tenements within the Greater Flying Fox area



1.2 Flora and Vegetation within the Greater Flying Fox area

Table 1 below provides a summary of the vegetation and flora/fauna of conservation significance identified within the eight flora surveys conducted by BC between 2006 and 2012 within the Greater Flying Fox area.

Table 1: Summary of flora and vegetation recorded within the Greater Flying Fox area

Date	Survey/Report	Vegetation	Flora/Fauna of Conservation Significance
February 2006	North Flying Fox 1	1. Eucalyptus mallee woodland 2. sandplain heath	
April 2006	North Flying Fox 2	1. Eucalyptus mallee woodland 2. sandplain heath	• <i>Verticordia mitodes</i> (P3)
August 2006	Monitoring Bores Flying Fox	1. <i>Eucalyptus salmonophloia</i> woodland 2. <i>Acacia</i> heath	• <i>Microcorys</i> sp. Forrestania (V. English, 2004) (P4)
November 2006	North-East Flying Fox	1. <i>Eucalyptus salmonophloia</i> woodland 2. <i>Eucalyptus</i> mallee woodland 3. Sandplain Heath 4. Kwongan vegetation	• <i>Microcorys</i> sp. Forrestania (V. English, 2004) (P4) • <i>Boronia westringioides</i> (P2), • <i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580) (P2) • <i>Dillwynia acerosa</i> (P1), <i>Microcorys pimeleoides</i> (P1)* • <i>Daviesia elongata</i> subsp. <i>implexa</i> (P3).
November 2007	Flying Fox Mine	1. Eucalyptus mallee woodland 2. Sandplain Heath 3. Rehabilitation vegetation	• <i>Microcorys</i> sp. Forrestania (V. English, 2004) (P4)
June 2008	New Morning-Spotted Quoll	1. <i>Eucalyptus</i> woodland 2. <i>Eucalyptus</i> mallee woodland 3. Salmon gum woodland 4. Sandplain heath 5. <i>Allocasuarina</i> shrubland 6. Rocky Outcrop	• <i>Eucalyptus steedmanii</i> (T) • <i>Eremophila racemosa</i> (P4) <i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)
January 2009	Lounge Lizard/ Flying Fox gravel pit	1. Eucalyptus mallee woodland 2. Sandplain Heath	• <i>Microcorys</i> sp. Forrestania (V. English, 2004) (P4)
October 2012	Greater Flying Fox	1. Open shrub mallee of <i>Eucalyptus eremophila</i> and <i>Eucalyptus pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i> ; 2. Heath of mixed <i>Acacia/Allocasuarina/Melaleuca</i> ; 3. Open shrub mallee of <i>Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides</i> over low heath of mixed <i>Melaleuca</i> ; 4. Low woodland of <i>Eucalyptus salmonophloia</i> over low scrub of mixed <i>Melaleuca</i> ; 5. Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub; 6. Low woodland of <i>Eucalyptus salmonophloia</i> over mallee of <i>Eucalyptus cylindrocarpa</i> , <i>Eucalyptus cylindriflora</i> and <i>Eucalyptus pileata</i> ; 7. Heath of <i>Melaleuca hamata/Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i> ; 8. Regrowth forest of <i>Eucalyptus salmonophloia/Eucalyptus salubris</i> over	• <i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968) (P1) • <i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580) (P2) • <i>Boronia westringioides</i> (P2) • <i>Daviesia elongata</i> subsp. <i>implexa</i> (P3) • <i>Dillwynia acerosa</i> (P3) • <i>Eutaxia acanthoclada</i> (P3) • <i>Microcorys</i> sp. Forrestania (V. English 2004) • <i>Verticordia mitodes</i> (P3).

		heath of <i>Melaleuca cucullata</i>/<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i>/<i>Acacia acanthoclada</i>; and 9. Low woodland of <i>Eucalyptus polita</i>/<i>Eucalyptus platycorys</i>/<i>Eucalyptus horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i>/<i>Acacia intricata</i>; and 10. Open tree mallee of <i>Eucalyptus eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise.	
--	--	---	--

*no longer Priority Flora species (WAHERB, 2012)

1.3 Previous relevant flora surveys

New Morning Flora and Vegetation Survey, Botanica Consulting, August 2010

Botanica Consulting was commissioned by Western Areas NL to conduct a Level 1 flora and vegetation survey for the New Morning area, which is located approximately 140km south of Southern Cross. The survey covered an area of 60 hectares and was conducted from the 26th to 27th of May 2010.

Four vegetation communities were identified within the survey area: *Eucalyptus eremophila* mallee woodland on stony rise, *Acacia*/*Melaleuca* shrubland, *Allocasuarina*/*Melaleuca* shrubland and Mallee Woodland over *Melaleuca*. These vegetation communities were represented by a total of 17 Families, 37 Genera and 85 Species (including sub-species and variants).

The Declared Rare Flora species, *Eucalyptus steedmanii*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the Department of Environment and Conservation within the survey area was identified during the survey. One Priority Flora species, *Microcorys* sp. Forrestania (P4), was also recorded within the survey area.

The *Eucalyptus eremophila* mallee Woodland on stony rise vegetation group contains the DRF *Eucalyptus steedmanii* which has regional environmental significance as defined by the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. There were no Threatened Ecological Communities (TEC) as listed by the DEC recorded within the survey area (DEC, 2010). The survey area is however located within a Priority 3 Ecological Community known as the Ironcap Hills vegetation complex. The entire survey area was located inside the south western corner of the Lake Cronin Environmentally Sensitive Area (ESA). The Lake Cronin area is listed by the Department of Environment, Water, Heritage and the Arts (DEWHA) as a Register of the National Estate (RNE). The Lake Cronin RNE does not have formal protection under the *EPBC Act 1999*.

Based on Keighery (1994), all seven vegetation communities were classed as having a 'very good' health rating. One introduced species, *Dittrichia graveolens*, was identified within the survey area. According to the Department of Agriculture and Food Western Australia, this species is not listed as Declared Plants.

This survey occurs 20m south of the Greater Flying Fox area.

New Morning Flora and Vegetation Survey, Botanica Consulting, November 2010

BC was commissioned by Western Areas NL to conduct a Level 1 flora and vegetation survey for the New Morning area, which is located approximately 140km south of Southern Cross. The survey covered an area of 130 hectares and was conducted on the 10th of September 2009.

Three vegetation communities were identified within the survey area: Mallee woodland, *Acacia steedmanii* subsp. *steedmanii* shrubland and *Allocasuarina* shrubland. These vegetation communities were represented by a total of 20 Families, 33 Genera and 66 Species (including sub-species and variants).

One Declared Rare Flora (DRF) species, *Eucalyptus steedmanii*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the Department of Environment and Conservation (DEC) within the survey area was identified during the survey. No Priority Flora species were recorded within the survey area.

None of the vegetation communities identified in the survey area contain TECs listed by the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. There are no PECs as listed by the DEC in the survey area. The northwest corner of the survey area is within the Lake Cronin Environmentally Sensitive Area (ESA).

Based on Keighery (1994), all seven vegetation communities were classed as having a 'very good' health rating. No introduced species were identified within the survey area.

This survey occurs approximately 1.2km south of the Greater Flying Fox area.

Spotted Quoll/Cosmic Boy Haul Road Flora and Vegetation Survey, Botanica Consulting, January 2011

BC was commissioned by Western Areas NL to conduct a level 2 flora and vegetation survey for the Spotted Quoll/Cosmic Boy (SQ/CB) Haul Road area, located approximately 77.3 km east of Hyden, WA. The survey covered an area of 412.4 hectares and was conducted from the 30th of November to the 1st December 2009. This region was visited in January 2011 to re-assess the vegetation

composition of the area and establish more quadrats. A total of 27 quadrats were established within the survey area.

Eleven vegetation communities and three sub-communities were identified within the survey area:

1. Rehabilitation Area;
2. *Eucalyptus urna* woodland;
3. *Eucalyptus livida* woodland;
4. *Eucalyptus salubris* woodland;
5. *Eucalyptus eremophila* subsp. *eremophila* and *E. cylindrocarpa* Mallee shrubland;
6. Mixed Mallee shrubland over *Melaleuca* shrubland;
7. Burnt *Eucalyptus salmonophloia* woodland over mixed Mallee shrubland (including sub-groups *Melaleuca hamata* thicket and *Melaleuca lanceolata* thicket);
8. *Eucalyptus salmonophloia* woodland,
9. Mixed Mallee and mixed shrub thicket on Banded Ironstone Ridge,
10. Mixed Mallee shrubland (including sub-group *Eucalyptus horistes* Mallee shrubland); and
11. *Eucalyptus goniocarpa* shrubland.

These vegetation communities were represented by a total of 27 Families, 60 Genera and 141 Species (including sub-species and variants). No DRF species pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC within the survey area was identified during the survey. However, Population 2 of the DRF species *Eucalyptus steedmanii* is located approximately 20m north-east and 470m west of the most northern region of the survey area. Four Priority Flora species; *Stenanthemum liberum* (P1), *Stylidium sejunctum* (P2), *Microcorys* sp. Forrestania (V. English, 2004) (P4) and *Eutaxia acanthoclada* (P3) were recorded in the survey area.

None of the vegetation communities have National Environmental Significance as defined by the *EPBC Act 1999*. However the *E. salmonophloia* woodland vegetation group located within the far northern region of the survey area has a DRF population located approximately 20m north-east and 470m west. Within a minimum 50m boundary surrounding any DRF plant is considered an ESA. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the survey area. The survey area is however located within the North Ironcap and the Middle Ironcap Priority Ecological Communities of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

Based on Keighery (1994), one vegetation group was classed as being 'degraded', three were classed as 'good' and the remaining seven were classed as having a 'very good' health condition. Two introduced species, *Carduus nutans* and *Salvia verbenaca*, were identified within the survey area. According to the Department of Agriculture and Food Western Australia (DAFWA), neither of these species are listed as Declared Plants.

This survey occurs approximately 3.8km south of the Greater Flying Fox area.

Level 1 Flora and Vegetation Survey of Beautiful Sunday, Botanica Consulting, September 2011

BC was commissioned by Western Areas NL to conduct a Level 1 flora and vegetation survey for the Beautiful Sunday area. The survey area was located 49.8 km north-northeast of Varley, WA, 76.3 km east of Hyden, WA and 4.5 km northwest of the intersection of the Hyden Norseman Road and the Southern Cross Road. The survey covered an area of 252 hectares and was conducted on the 23rd of September 2011.

Seven vegetation communities were identified within the survey area:

1. Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over low grass of *Borya constricta*;
2. Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*/*Eucalyptus cylindriflora*/*Eucalyptus pileata*;
3. Forest of *Eucalyptus melanoxydon* and *Eucalyptus urna* over thicket of *Melaleuca pauperiflora* subsp. *fastigiata*;
4. Open low scrub of *Acacia hemiteles* over very open low grass of *Aristida contorta*;
5. Open mallee of *Eucalyptus livida* over heath of *Allocasuarina acutivalvis*;
6. Mallee of *Eucalyptus eremophila* and *Eucalyptus urna* over heath of *Daviesia nematophylla* and *Melaleuca adnata*; and
7. Heath of *Allocasuarina campestris* and *Hakea kippistiana*.

These vegetation communities were represented by a total of 32 Families, 61 Genera and 108 Species (including sub-species and variants). The DRF species, *Banksia sphaerocarpa* var. *dolichostyla*, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)* and as listed by the DEC within the survey area was identified during the survey. Two Priority Flora species *Stylidium sejunctum* (P2) and *Eremophila biserrata* (P4) were also recorded within the survey area.

The Open mallee of *Eucalyptus livida* over heath of *Allocasuarina acutivalvis* vegetation community has national environmental significance as defined by the Commonwealth *EPBC Act 1999* as it contains DRF. There are no TEC as defined by Commonwealth legislation or listed by the DEC recorded within the survey area. The survey area is however located within the North Ironcap Priority Ecological Communities of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community. Approximately 186ha of the Beautiful Sunday survey area lies within the 10km buffer zone of the Lake Cronin ESA.

Based on Keighery (1994), all seven vegetation communities were classed as having a 'very good' health rating. Four introduced species, *Carpobrotus aequilaterus*, *Arctotheca calendula*, *Ursinia anthemoides* and *Dittrichia graveolens*, were identified within the survey area. According to the DAFWA, none of these species are listed as Declared Plants.

The Beautiful Sunday survey area occurs 3.5km north of the Greater Flying Fox area.

2 Regional Biophysical Environment

2.1 Regional Environment

The Greater Flying Fox Area lies on the border of the Coolgardie and Mallee Regions. The Coolgardie Region forms part Southwestern Interzone of Western Australia in a region known as the Coolgardie Botanical District (Beard, 1990). The area consists of predominantly eucalypt woodlands, becoming open and with saltbush-bluebush understorey on more calcareous soils (Beard, 1990). The Mallee Region is part of the South-West Province Australia in a region known as the Roe Botanical District. In this area the general cover is mallee with *Eucalyptus eremophila* the most consistent species. Both the Mallee and Coolgardie Regions are further divided into subregions, based on the Interim Biogeographic Regionalisation of Australia (IBRA). The Greater Flying Fox Area is located on the border between the Western Mallee (MAL2) and Southern Cross (COO2) subregions, see Figure 3 (Cowan, 2001).

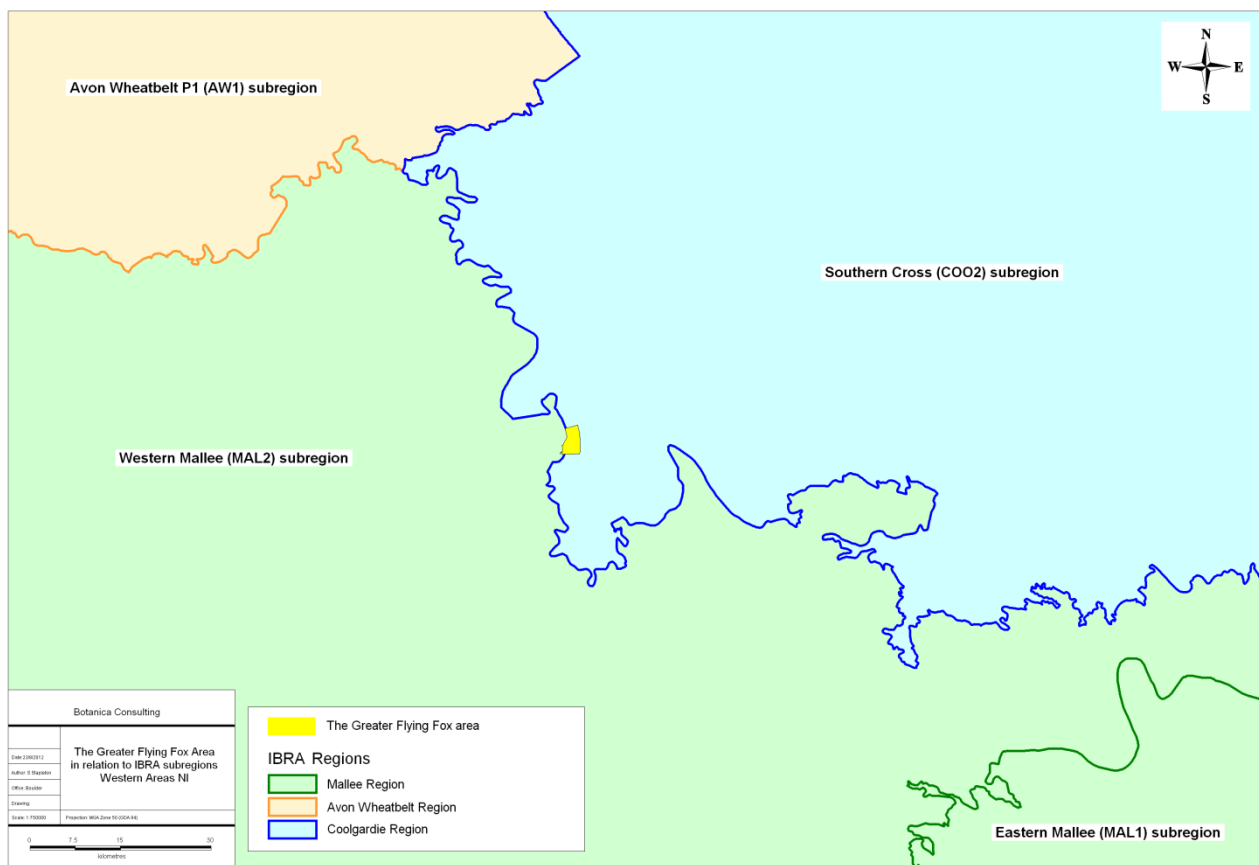


Figure 3: IBRA subregions surrounding the Greater Flying Fox area

2.2 Conservation Areas

The entire Greater Flying Fox area lies within the Lake Cronin Environmentally Sensitive Area (ESA) and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the Environmental Protection Authority (EPA, 2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *Conservation Land Management (CALM) Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap Banded Ironstone Formation (BIF) located approximately 5km north-west region of the Greater Flying Fox area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha. Figure 4 provides a map of the existing and proposed conservation areas in relation to the Greater Flying Fox area.

The Greater Flying Fox area also lies within the Great Western Woodlands. The Great Western Woodlands is considered by The Wilderness Society of WA to be of global biological and conservation importance as one of the largest and healthiest temperate woodlands on Earth, containing many endemic species. The region covers almost 16 million hectares, 160,000 square kilometres, from the southern edge of the Western Australian Wheatbelt to the pastoral lands of the Mulga country in the north, the inland deserts to the northeast, and the treeless Nullarbor Plain to the east (Figure 4).

The area provides an eastward connection between southwest forests and inland deserts (Gondwana Link) as well as linking the north-west passage to Shark Bay. The majority of the Great Western Woodlands is unallocated crown land (61.1%) with other interests including pastoral leases (20.4%), conservation reserves (15.4%) unallocated crown land ex pastoral managed by the DEC (2%) and private land (approximately 1%) (Watson *et. al.*, 2008).

No specific management strategy applies to the Great Western Woodlands, rather an approach to conservation which occurs across all land tenures and when different stakeholders work together with biodiversity in mind. The central component of this approach is to identify and conserve key large-scale, long term ecological processes that drive connectivity between ecosystems and species. The Great Western Woodlands currently includes towns, highways, roads, railways, private property, Crown Reserves, agricultural activities and mining tenements.

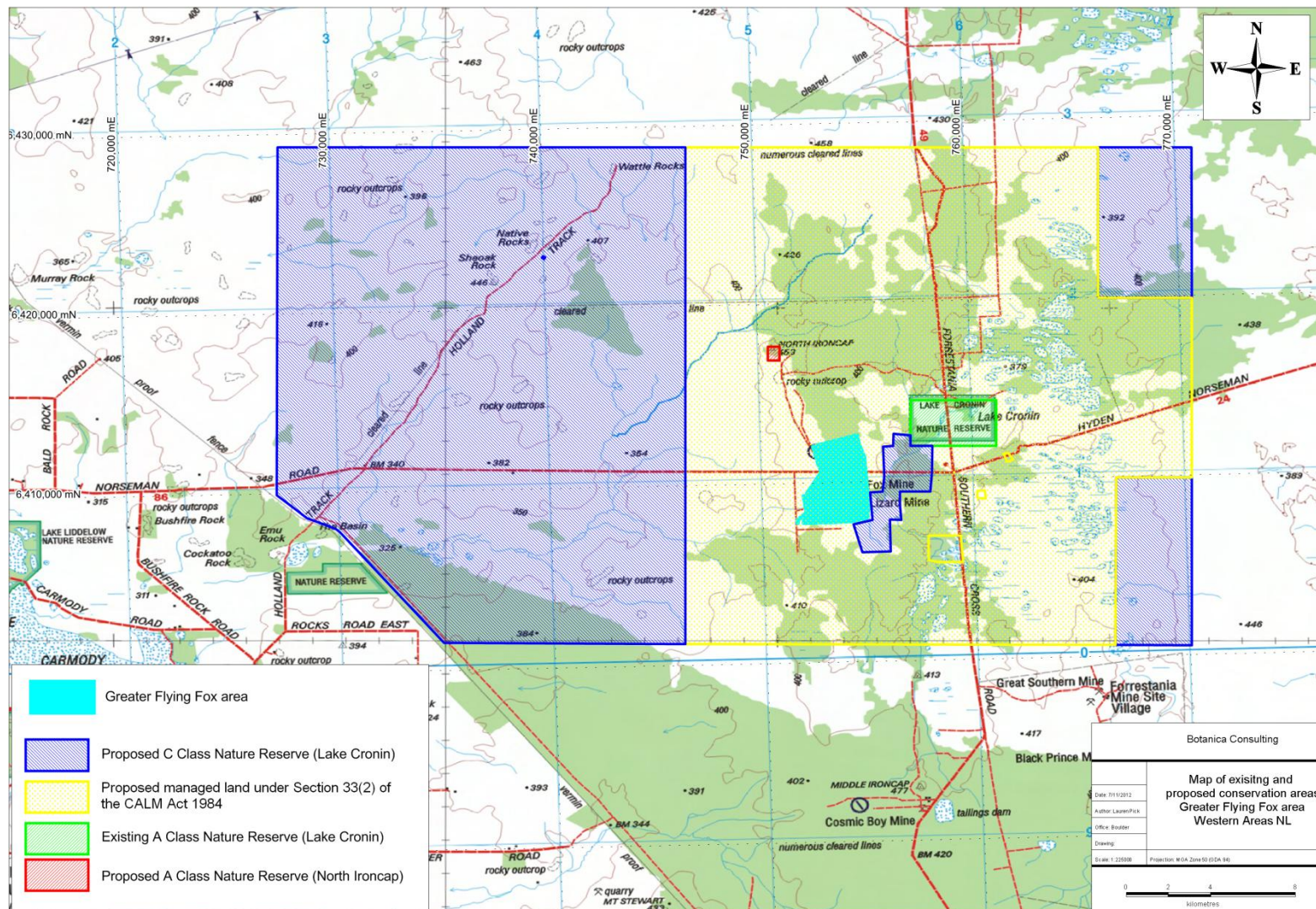


Figure 4: Map of existing and proposed Conservation Areas (EPA, 2009) in relation to the Greater Flying Fox area

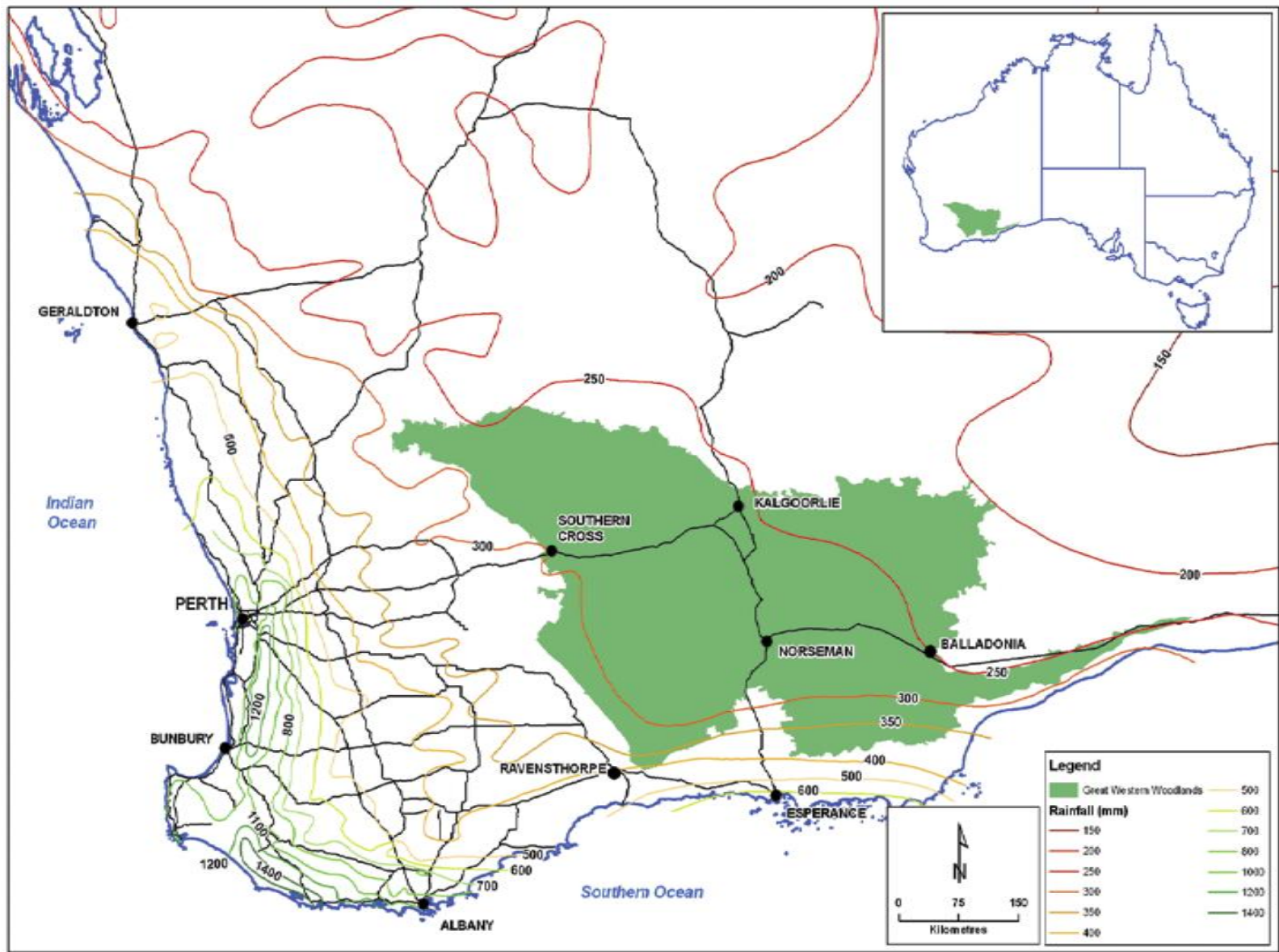


Figure 5: Location map of the Great Western Woodlands (DEC, 2010a).

2.3 Topography & Soils

The Southern Cross subregion (COO2) lies on the Yilgarn Craton's 'Southern Cross Terrains'. The relief is subdued and comprises of gently undulating uplands dissected by broad valleys with bands of low greenstone hills. The underlying geology is of granite strata interrupted by parallel intrusions of Archaean Greenstone. Calcareous earths are the dominant soil community and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (Cowan, 2001). The Western Mallee (MAL2) subregion lies on the south-eastern part of the Yilgarn Craton. It is a gently undulating country of low relief with duplex mallee soil (Beecham & Danks, 2001).

2.4 Vegetation

Vegetation of the Southern Cross subregion in the Coolgardie Botanical District is predominantly Eucalypt woodlands, Mallees, Acacia thickets and scrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on the low greenstone hills, valley alluvials and broad plains of calcareous earths. Salt lakes support dwarf shrublands of samphire. The area is rich in endemic *Acacias* (Cowan, 2001). The Western Mallee subregion vegetation commonly includes Mallee over myrtaceous-proteaceous heaths, *Melaleuca* shrublands, Samphire low shrublands on saline depressions and mixed Eucalypt woodlands. Mallee communities of the Western Mallee subregion occur on a variety of surfaces; *Eucalyptus* woodlands occur mainly on finetextured soils, with scrub-heath on sands and laterite (Beecham & Danks, 2001).

During a biological survey of the 20,300km² within the Lake Johnston-Hyden area (How, Newbey, Dell, Muir & Hnatiuk, 1988) Newbey and Milewski identified seven land units: Breakaway, Granite Exposure, Hill (Banded Ironstone Formation), Salt Lake Features (Saline flats, well-drained flats), Sandplains, Undulating Plain and Broad Valley. According to Newbey and Hnatiuk (1988) these seven land units comprised of 51 vegetation types, including four vegetation complexes; Breakaway complex, Banded Ironstone Formation (BIF) complex, Granite complex and Greenstone complex. Seven of these vegetation types were considered unique to the area; breakaway complex, BIF complex, greenstone complex, *Acacia jennerae* tall shrubland, *Eucalyptus georgei* low woodland, *Eucalyptus* sp. HRN 5603) low woodland and *E. scyphocalyx* Mallee.

The DAFWA GIS file (2007) indicates that the Greater Flying Fox Area is located within Pre-European Beard vegetation associations Forrestania 511, Forrestania 519 and Forrestania 2048 in Southern Cross (COO2) subregion, and in vegetation associations Forrestania 519 and Forrestania 2048 in the Western Mallee (MAL2) subregion. The extent of these vegetation associations as described by the DAFWA is shown in Table 2.

Table 2: Pre-European Beard Vegetation Associations within the survey area (DAFWA, 2011)

IBRA Subregion	Veg association	Pre-European Extent (ha)	Current Extent (ha)	Pre-European extent remaining (%)	% of Current extent within DEC managed lands	Vegetation Description (Beard, 1990)
COO2	Forrestania 511	153 641.65	153 336.64	99.80	9.70	Medium woodland; salmon gum & morrel
	Forrestania 519	196.88	196.88	100	0	Shrublands; mallee scrub, <i>Eucalyptus eremophila</i>
	Forrestania 2048	2 093.32	2085.32	99.60	2.40	Shrublands; scrub-heath in the Mallee Region
MAL2	Forrestania 519	17 763.58	17 332.51	97.57	0.72	Shrublands; mallee scrub, <i>Eucalyptus eremophila</i>
	Forrestania 2048	5 735.92	5651.19	98.52	0	Shrublands; scrub-heath in the Mallee Region

Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered “endangered”.

2.5 Climate

The climate of the Southern Cross subregion is characterised as arid to semi-arid Mediterranean with an annual rainfall of 200-300mm (Beard, 1990; Cowan, 2001). The climate of the Western Mallee subregion is characterised as dry warm Mediterranean with an annual rainfall of 300-500mm (Beard, 1990; Beecham & Danks, 2001). Rainfall data for the Lake Carmody weather station (#10565) located approximately 15km south of the Greater Flying Fox area is shown in Figure 6 (Bureau of Meteorology, BOM, 2012).

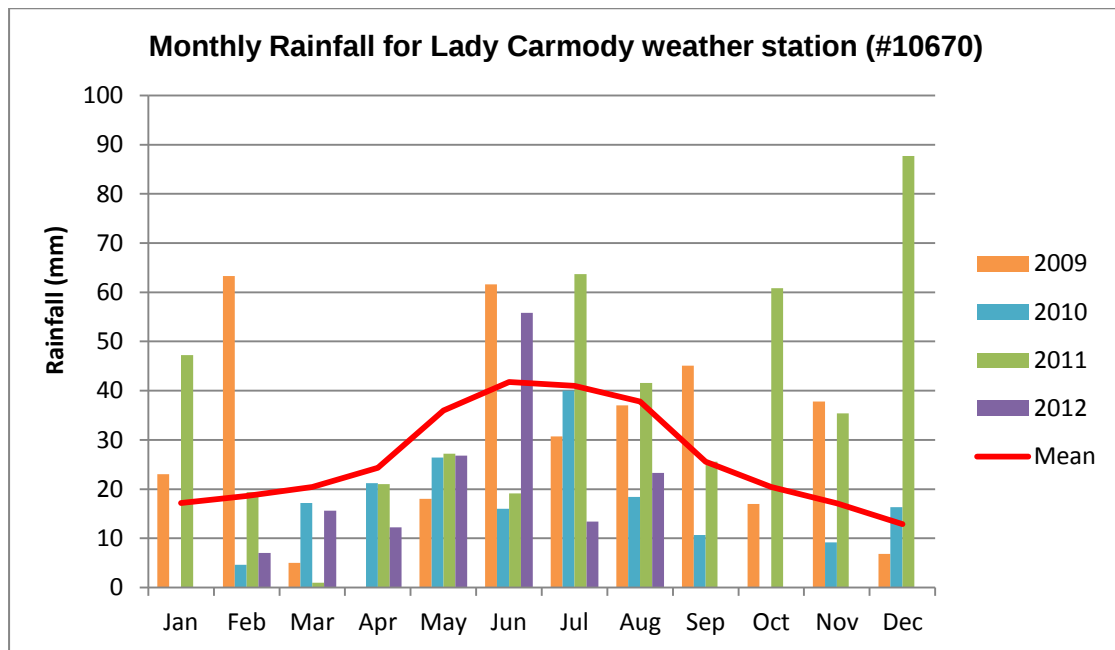


Figure 6: Monthly rainfall from January 2009 to August 2012 and mean monthly rainfall (September 1905 to August 2012) for the Lake Carmody weather station (#10670) (BOM, 2012)

2.6 Land Use

Based on the findings from its 2001 biodiversity audit, CALM identified the dominant land uses of the COO2 IBRA subregion as native pastures (17%), Conservation Reserves (11.53%), UCL & Crown Reserves (66.74%) and Cultivation – Dry Land agriculture (2.27%) (Cowan, 2001). The dominant land uses of the MAL2 IBRA subregion is Dry Land agriculture, UCL & Crown Reserves, and roads and other easements.

2.7 Survey Objectives

The objectives of the survey undertaken were to:

- Compile a broad scale vegetation community flora map and species list of the Greater Flying Fox area (Appendix 3);
- Document and map locations of any Threatened or Priority listed flora species located; (Appendix 3 and 4);
- Assess the regional and local conservation status of plant species and ecological communities within the Greater Flying Fox Area; and
- Identify and map occurrences of any “Declared and Environmental” weeds within the Greater Flying Fox Area.

3 Survey Methodology

3.1 Desktop Assessment

Prior to the field survey, the results of the combined search of the DEC Flora of Conservation Significance databases (DEC, 2012a), were obtained by BC. These significant flora species were examined on the Western Australian Herbarium's web page (WAHERB, 2012) prior to the survey to familiarise staff with their appearance. Locations of Threatened Flora and Priority Flora species revealed in the databases search were overlaid on aerial photography of the area. Vegetation descriptions of locations and available pictures of the Priority Flora were obtained from Florabase.

Priority Flora and their respective vegetation types were targeted in the survey area and all areas of occurrence were traversed on foot specifically looking for the Threatened flora associated with that vegetation description. Table 3 lists the definitions of Threatened and Priority ratings under the *Wildlife Conservation Act (1950)* as extracted from Florabase (WAHERB, 2012).

Table 3: Definitions of Rare and Priority Flora Species (WAHERB, 2011).

T: Schedule 1 Threatened Flora (Declared Rare Flora)-extant under the <i>Wildlife Conservation Act 1950</i>
Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X: Schedule 2 Declared Rare flora – Presumed Extinct Taxa under the <i>Wildlife Conservation Act 1950</i>
Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
1: Priority One – Poorly known Species
Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
2: Priority Two – Poorly Known Species
Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
3: Priority Three – Poorly known Species
Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
4: Priority Four – Rare, Near Threatened and other species in need of monitoring

1. Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
2. Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
3. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

5: Priority 5 – Conservation Dependent Species

Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

3.2 Sampling and Analysis Methods

BC was commissioned by Western Areas in 2012 to conduct a Level 1 flora and vegetation survey of 267ha within the 1178ha (including 130ha cleared for mining operation) Greater Flying Fox area. 781ha of the Greater Flying Fox area has been previously surveyed by BC from 2006 to 2008. The fieldwork was completed on the 29th August 2012. The objective of the survey was to document all observed “Threatened/Declared Rare and Priority Flora” species encountered and the occurrences of any “Environmental or Declared Weeds” observed within or adjacent to the Greater Flying Fox area. The Greater Flying Fox area was traversed by two people via all-terrain vehicle and on foot. Figure 7 provides a map of the areas traversed throughout the survey.

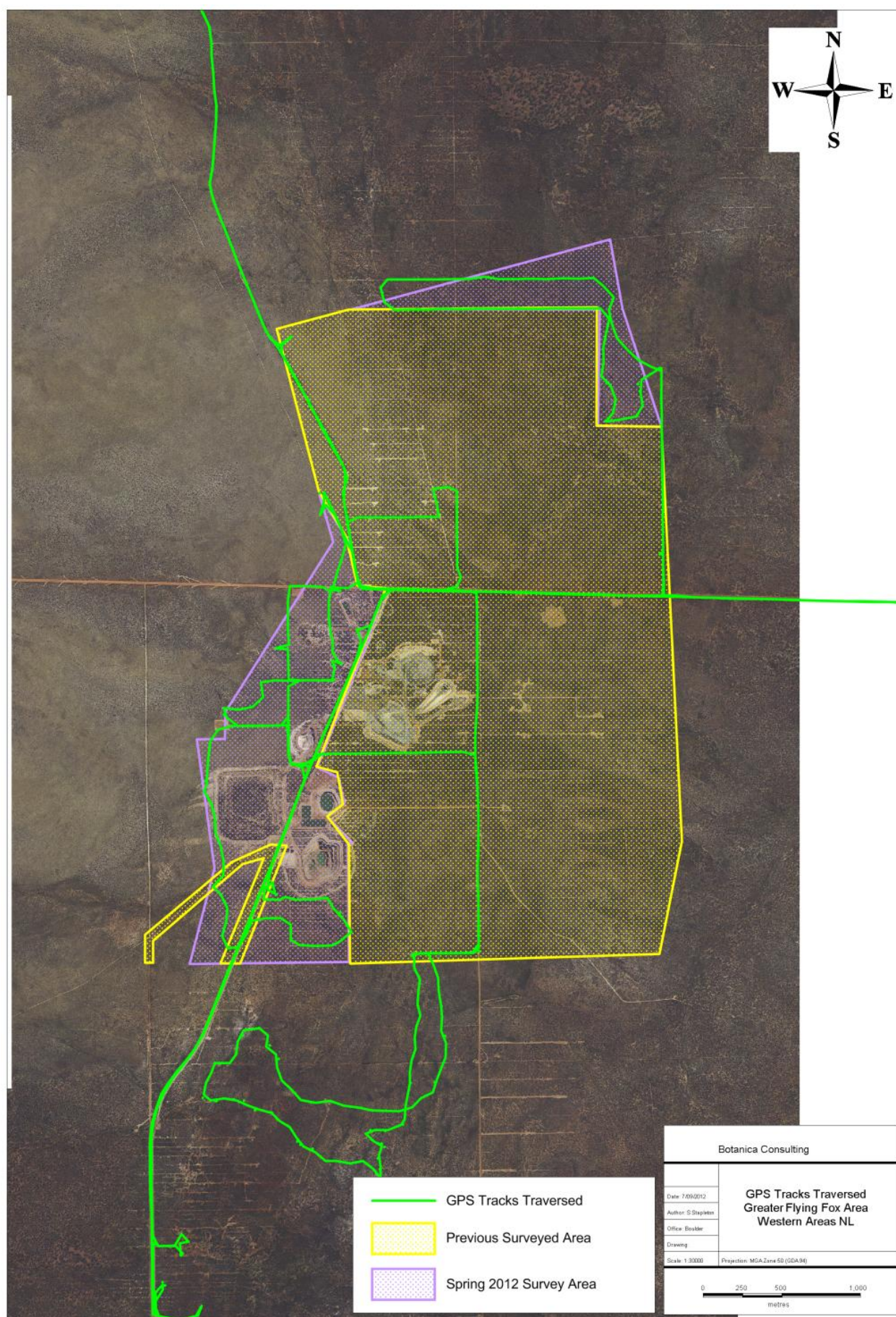


Figure 7: GPS tracks traversed throughout the Spring 2012 survey

Prior to the commencement of field work, aerial photography was inspected and obvious differences in the vegetation assemblages were identified. The different vegetation communities identified were then inspected during the field survey to assess their validity. A handheld GPS unit was used to record the co-ordinates of the boundaries between existing vegetation communities.

At each sample point, the following information was recorded:

- GPS location;
- Photograph of vegetation;
- Dominant species;
- Collection and documentation of unknown plant specimens; and
- GPS location, photograph and collection of Threatened Flora if encountered.

Unknown specimens collected during the survey were identified with the aid of samples housed at the BC Herbarium and the Western Australian Herbarium. Presence/absence data of species from sample sites of similar vegetation was then compiled forming the best representative vegetation communities. Similar vegetation communities were recognised visually in the field.

3.2.1 Personnel involved

Jim Williams - Environmental Consultant/Botanist (Diploma of Horticulture)
Lauren Pick - Environmental Consultant/Botanist (BSc Conservation Biology)

3.2.2 Scientific licences

Table 4: Scientific licenses of Botanica staff coordinating the Spring 2012 survey

Licensed staff	Permit Number	Valid Until
Jim Williams	SL009978	25-04-2013
Lauren Pick	SL009979	25-04-2013

3.3 Data Analysis Tools

Once the survey was completed the data obtained was analysed to generate a vegetation map (Appendix 3).

3.4 Flora survey limitations and constraints

It is important to note that there are limitations involved with conducting flora surveys, despite the careful planning that is put into their design. Such limitations that can occur are listed in Table 5 below.

Table 5: Limitations and constraints associated with the Spring 2012 survey.

Variable	Impact on Survey outcomes
Access problems	Much of the area contained access tracks and could be easily accessed by FWD. Areas not accessible by FWD were surveyed on foot.
Experience levels	The BC personnel that conducted the survey were regarded as suitably qualified and experienced. Coordinating Botanist: Jim Williams Field Staff: Jim Williams & Lauren Pick Data Interpretation: Jim Williams & Lauren Pick
Timing of survey, weather & season	Fieldwork was completed during the Environmental Protection Authority's (EPA) recommended time period (i.e., Spring) for detecting most ephemeral flora and when the majority of species are in flower (Figure 5) (BOM, 2012).
Sources of information	BC have conducted a number of surveys within the Forrestania region and were also able to obtain information about the area from previous research conducted within the Western Areas tenements and the surrounding region.
Mapping reliability	BC obtained a high resolution ortho aerial image to assist with vegetation mapping.
Area disturbance	The majority of the survey area is in very good condition and comprised of native vegetation. Disturbance in the area was a result of mining, exploration and access tracks.
Survey Intensity	Survey intensity was appropriate for the size/significance of the area with a Level 1 reconnaissance survey completed in Spring to identify vegetation communities and any Priority Flora. A targeted search to identify all Priority Flora populations was not conducted. Prior to any disturbance a targeted search in those vegetation communities identified as containing Priority Flora should be conducted along any proposed clearing.
Resources	The DEC provided several resources including threatened flora information which were used to complete the survey. Other information was utilised from previous BC surveys in the area.
Completeness	In the opinion of BC the survey area was covered sufficiently in order to identify vegetation assemblages. Many of the plants were in flower due to the time of year and above average rainfall in June; as a result many of the flora species could be fully identified. It is estimated that approximately 90% of the flora within the area were able to be fully identified. The vegetation communities for this study were based on visual descriptions of locations in the field. The distribution of these vegetation communities outside the study area is not known, however vegetation communities identified were categorized via comparison to vegetation distributions throughout WA given on Australian Natural Resources Atlas (ANRA, 2012).

4 **Results**

4.1 **Summary**

A total of ten vegetation communities were identified within the Greater Flying Fox area. These ten vegetation communities were represented by a total of 43 Families, 98 Genera and 278 Species (including sub-species and variants).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), were identified within the Greater Flying Fox area. Eight Priority Flora species were identified within the Greater Flying Fox area:

1. *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3);
2. *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2);
3. *Boronia westringioides* (P2);
4. *Daviesia elongata* subsp. *implexa* (P3);
5. *Dillwynia acerosa* (P3);
6. *Eutaxia acanthoclada* (P3);
7. *Microcorys* sp. Forrestania (V. English 2004); and
8. *Verticordia mitodes* (P3).

One of the vegetation communities has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contained an inactive *Leipoa ocellata* (malleefowl) mound. Malleefowl are listed as vulnerable under the *EPBC Act 1999*. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the Greater Flying Fox area. The Greater Flying Fox area is however located within the North Ironcap PEC of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

The entire Greater Flying Fox area lies within the Lake Cronin ESA) and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap BIF located approximately 5km north-west region of the Greater Flying Fox area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha.

The entire Greater Flying Fox area is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), two of the ten vegetation communities within the Greater Flying Fox area were rated as being in 'good' health. The remaining eight vegetation communities were rated as being in 'very good' health. No introduced species was identified within the Greater Flying Fox area.

4.2 Desktop Assessment

The results of the combined search of the DEC's Flora of Conservation Significance databases (DEC, 2011a) revealed twelve DEC listings of Priority Flora species within the Greater Flying Fox area:

1. *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2);
2. *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3);
3. *Boronia westringioides* (P2);
4. *Comesperma calicola* (P3);
5. *Cryptandra polyclada* subsp. *polyclada* (P3);
6. *Daviesia elongata* subsp. *implexa* (P3);
7. *Dillwynia acerosa* (P3);
8. *Dillwynia* sp. Capel (P.A. Jurjevich 1771) (P1);
9. *Eutaxia rubricarina* (P3);
10. *Microcorys* sp. Forrestania (V. English 2004) (P4);
11. *Pityrodia* sp. Yilgarn (A.P. Brown 2679) (P3); and
12. *Verticordia gracilis* (P3).

The locations of seven of these species were confirmed by BC during the survey however the location of *Comesperma calicola* (P3); *Cryptandra polyclada* subsp. *polyclada* (P3); *Dillwynia* sp. Capel (P.A. Jurjevich 1771) (P1); *Eutaxia rubricarina* (P3); and *Pityrodia* sp. Yilgarn (A.P. Brown 2679) (P3) were not identified. An additional Priority Flora species, *Verticordia mitoides* (P3), not listed on the DEC database was identified within the area.

A total of three Threatened Flora and 50 Priority Flora species were listed within a 10km radius of the Greater Flying Fox area. All of these Threatened/Priority Flora species have the potential to occur within the survey area as they occur in similar habitats and vegetation communities to those identified within the Greater Flying Fox area. Table 6 identifies the DEC listed Threatened/Priority Flora species potentially occurring within the Greater Flying Fox area.

Table 6: Priority Flora with the potential to occur within the Greater Flying Fox area (WAHERB, 2012)

Species	Conservation Code	Description (WAHERB, 2012)
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i>	T	Lignotuberous shrub, 1-3 m high. Fl. yellow-orange, Mar to May. Lateritic gravel, grey sand.
<i>Eucalyptus steedmanii</i>	T	Tree, 2-8(-12) m high, bark smooth. Fl. white, Jan to Mar. Gravelly loam over ironstone, sand. Low hills, undulating plains.
<i>Paragoodia crenulata</i>	T	No description available
<i>Acacia asepala</i>	2	Diffuse, much-branched shrub, 0.5-1.5 m high. Fl. yellow, Aug. Red-brown sandy loam. Undulating plains, along drainage lines.
<i>Acacia kerryana</i>	2	Low, spreading, domed shrub, 0.3-1 m high. Fl. yellow, Oct to Dec or Jan to Feb. Granitic loamy sand, stony clayey loam or clayey sand. Low stony ridges, undulating plains.
<i>Austrostipa</i> sp. Mt Holland (W.A. Thompson & J. Allen 948)	1	No description available
<i>Baeckea</i> sp. Blue Haze Mine (P. Armstrong 06/910)	1	No description available
<i>Baeckea</i> sp. Crossroads (B.L. Rye & M.E. Trudgen 241186)	1	No description available
<i>Baeckea</i> sp. Hatter Hill (K.R. Newbey 3284)	3	Narrow, open, upright shrub, to 1.3 m high. Fl. pink, Jun to Oct. Yellow-orange coarse sandy loam with laterite gravel, red-brown sandy loam with quartz pebbles. Undulating plains.
<i>Baeckea</i> sp. Lake Cronin (K.R. Newbey 9191)	1	Upright, spreading, moderately open shrub. Fl. white/pink, Oct. Well-drained gravelly sands. Moderately exposed, gently undulating plain.
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	2	Erect, open shrub, to 0.4 m high. Fl. white/pink, Oct. Red clay. Gently undulating sandplains.
<i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968)	3	Straggly, erect shrub, to 1.5 m high. Fl. pink, Jun. Yellow to orange sandy loam with laterite gravel. Gently undulating sandplains, low ridges, road verges.
<i>Bentleya diminuta</i>	2	Rosetted rhizomatous, perennial, herb or shrub, 0.02-0.05 m high, growing in small colonies. Fl. white/yellow-green, Sep to Nov. Sandy clay or loam with calcareous nodules.
<i>Boronia westringioides</i>	2	Erect shrub, 0.2-0.75 m high. Fl. pink, Jul to Sep. Loamy sand. Plains.
<i>Brachyloma nguba</i>	1	Erect, compact to spreading, mid-dense shrub, to 0.8 m high, leaves discolorous, usually 2-3 mm long; style 0.2-0.25 mm long; disc truncate. Fl. red, Apr to May. White to brown sandy clay, shallow sandy loam. Open mallee woodland, mallee scrub, flat plains.
<i>Calamphoreus inflatus</i>	4	Erect, spreading shrub, 0.4-1.6 m high, to 2 m wide. Fl. blue-purple/green, Oct to Dec or Feb to Mar. Clay loam with ironstone gravel. Flats,

Species	Conservation Code	Description (WAHERB, 2012)
		disturbed sites.
<i>Comesperma calicola</i>	3	Soft perennial, herb, to 0.3 m high. Fl. pink, Oct to Dec or Jan. Calcareous or semi-saline clay loams, limestone. Areas around saline water
<i>Conospermum sigmoideum</i>	2	Erect shrub, 0.2-0.5 m high. Fl. blue, Aug to Sep. Yellow sand.
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	3	Mat-forming or upright shrub, 0.1-0.7 m high. Fl. white/cream, Jan to May or Aug or Oct. Sand. Sandplains.
<i>Dampiera scaevolina</i>	1	Erect to ascending perennial, herb or shrub, 0.2-0.5 m high. Fl. blue/white, Sep to Nov. Sandy & gravelly soils.
<i>Daviesia elongata</i> subsp. <i>implexa</i>	3	Spreading or sprawling shrub, 0.4-1 m high. Fl. yellow/orange & red, Sep. Sand & laterite.
<i>Dillwynia acerosa</i>	3	Shrub, to 0.5 m high. Fl. yellow/red, Sep. Gravelly clay with laterite.
<i>Dillwynia</i> sp. Capel (P.A. Jurjevich 1771)	1	Erect, open, spreading shrub, to 2 m high. Fl. yellow & orange & red & pink, Sep to Oct. Littered grey loamy sand, rocky soils. Valleys, rangelands
<i>Elatine macrocalyx</i>	3	Prostrate, glabrous, mat-forming annual, herb, sepals 2-3mm long, fruit indehiscent. Fl. white, May to Oct (probably opportunistic). Shallow sands over clay. Margins of playa lakes and clay pans.
<i>Eremophila biserrata</i>	4	Prostrate shrub, to 3 m wide. Fl. green/yellow-green, Sep to Nov or Mar. Sandy or sandy clay soils. Alluvial flats, salt flats & lakes.
<i>Eremophila racemosa</i>	4	Erect shrub, 0.5-1.7 m high. Fl. purple-pink-red/white, Mar or Aug to Dec. Sandy or stony loam, clay loam. Undulating plains, roadsides.
<i>Eucalyptus exigua</i>	3	Mallee, 2-5 m high, bark smooth. Fl. white-cream, Mar. Sandy loam, white sand. Sandplains.
<i>Eucalyptus georgei</i> subsp. <i>fulgida</i>	4	Tree, 4-20 m high, bark smooth, often hanging in ribbons. Fl. cream-white. Sandy loam, clayey sand. Slight depressions.
<i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>	1	Mallee or tree, 3-10 m high, bark rough, coarse & flaky on trunk, smooth above. Loam. Swamps, plains.
<i>Eutaxia acanthoclada</i>	3	Compact, mat-forming, prostrate shrub, to 0.3 m high. Fl. yellow/orange/red, Oct to Nov. Light brown sandy clay, shallow sandy loam, red clay over banded ironstone, gravel. Gently undulating plains.
<i>Eutaxia nanophylla</i>	3	Straggly, rounded shrub, to 0.35 m high. Fl. Yellow & orange & red, Oct to Nov. Clayey sand, red clay, stoney clayey loam. Low-lying areas, damp flats, slopes, undulating plains, low stony ridges.

Species	Conservation Code	Description (WAHERB, 2012)
<i>Eutaxia rubricarina</i>	3	Straggling shrub, to 0.5 m high. Fl. Orange & yellow & brown, Aug or Oct. Gravelly sand, grey to pinkish-white sandy clay, red loam. Flats, slopes, valley floors, road verges.
<i>Frankenia drummondii</i>	3	Prostrate shrub. Fl. white. Sand. Lake edges.
<i>Gastrolobium tenue</i>	1	Low, bushy shrub, to 0.6 m high. Fl. Orange & red & purple, Sep to Oct. Yellow sand or sandy clay. Undulating dunes, stony outcrops.
<i>Gnephosis intonsa</i>	1	Prostrate to ascending annual, herb, 0.01-0.04 m high. Fl. yellow-brown, Sep to Oct. Red/brown clay, stony saline loam.
<i>Grevillea pilosa</i> subsp. <i>redacta</i>	3	Spreading to prostrate, non-lignotuberous shrub, 0.4-1.2 m high. Fl. red, Feb or Oct or Dec. Sand, laterite.
<i>Grevillea prostrata</i>	4	Loose, prostrate shrub, 0.04-0.1 m high, 0.8-1.2 m wide. Fl. cream-white/pink-red, Aug to Dec or Jan. White, grey or yellow sand, gravel. Sandplains.
<i>Guichenotia asteriskos</i>	2	Erect, compact shrub, ca 0.35 m high. Fl. white, Sep to Oct. Sandy clay or loam with gravel.
<i>Haegiela tatei</i>	4	Ascending to erect annual, herb, 0.02-0.08(-0.2) m high. Fl. white-yellow, Aug to Nov. Clay, sandy loam, gypsum. Saline habitats.
<i>Hibbertia pachyphylla</i>	3	Shrub, to 0.5 m high. Fl. yellow, Sep to Nov. White to yellow sand, brown sandy gravel, gravelly loam, laterite, granite, quartz. Undulating plains, low rises, valley floors.
<i>Isolepis australiensis</i>	3	Annual, grass-like or herb (sedge), 0.03-0.055 m high, glumes 0.8-1.2 mm long; stamens 1(-2); style branches 3; nut with abaxial angle acute. Fl. Jun or Sep. Silty sand, sandy clay. Lake margins, pools.
<i>Keraudrenia adenogyna</i>	3	Erect shrub, ca 0.4 m high. Fl. purple-blue, Sep. Heavy loamy clay, loamy gravelly soils. Low-lying area.
<i>Melaleuca macrorychia</i> subsp. <i>trygonoides</i>	3	Multi-stemmed, spreading shrub, 1-4 m high, leaves broadly elliptic. Fl. red, Feb or Jul to Aug or Oct. Sandy soils. Granite outcrops.
<i>Microcorys</i> sp. <i>Forrestania</i> (V. English 2004)	4	Prostrate or erect shrub, 0.35-0.4 m high. Fl. white/purple, Jan or Apr. Yellow sandy clay or red-brown clay. Open woodland or cleared areas.
<i>Mirbelia densiflora</i>	3	Erect or straggling shrub, 0.2-1 m high. Fl. yellow-orange, Oct or Jan. Stony loam, loamy sand. Small ridges, breakaways, undulating plains.
<i>Olearia laciniifolia</i>	2	Erect, few-stemmed shrub, 0.6-1.2 m high. Fl. blue/purple & white/yellow, May to Sep. White sand. Around playa lakes.
<i>Pityrodia</i> sp. <i>Yilgarn</i> (A.P. Brown 2679)	3	No description available

Species	Conservation Code	Description (WAHERB, 2012)
<i>Pultenaea daena</i>	3	Dense, prostrate, domed shrub, to 0.07 m high. Fl. yellow, Mar. White to yellow sand or sandy loam, sandy or loamy clay, gravel, limestone, dolomite, laterite. Gently undulating plains, adjacent to salt lakes, in disturbed areas.
<i>Scaevola tortuosa</i>	1	Ascending perennial, herb, 0.1-0.2 m high. Fl. blue-purple/pink, Oct. Sandy clay. Margins of salt lakes.
<i>Stylidium sejunctum</i>	2	Caespitose perennial, herb, 0.25-0.45 m high, Leaves tufted, linear to narrowly oblanceolate, 10-30 cm long, 0.8-4 mm wide, apex acute to mucronate, margin involute, glabrous to scabrous. Membraneous scale leaves present at base of mature leaves. Scape glandular throughout. Inflorescence paniculate. Fl. white/pink-purple, Sep to Nov. Clayey sand or loam, laterite. Outcrops, upper slopes, breakaways. Mallee and Allocasuarina shrubland.
<i>Stylidium validum</i>	1	Caespitose perennial, herb, 0.06-0.3 m high, Leaves tufted, oblanceolate, 1.5-10 cm long, 2.2-6 mm wide, apex acute to acuminate, margin entire, glabrous, glaucous. Scape glabrous. Inflorescence paniculate. Fl. white/pink, Sep to Oct. Clayey sand or loam, ironstone, greenstone gravel. Hillslopes and hilltops. Eucalypt woodland, mallee shrubland.
<i>Verticordia gracilis</i>	3	Low, slender shrub, 0.15-0.6 m high. Fl. pink, Oct to Nov. Yellow sand, gravelly sand, sandy loam.
<i>Verticordia multiflora</i> subsp. <i>solox</i>	2	Erect to spreading shrub, 0.2-0.6 m high. Fl. yellow, Oct to Dec or Jan. Yellow sand over gravel, sand over granite.

4.3 Conservation Significant Flora Species

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012), were identified within the Greater Flying Fox area (DEC, 2011). Eight Priority Flora species were identified within the Greater Flying Fox area:

1. *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2);
2. *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968);
3. *Boronia westringioides* (P2);
4. *Daviesia elongata* subsp. *implexa* (P3);
5. *Dillwynia acerosa* (P3);
6. *Eutaxia acanthoclada* (P3);
7. *Microcorys* sp. Forrestania (V. English 2004); and
8. *Verticordia mitodes* (P3).

The species *Microcorys pimeleoides* was identified as Priority Flora in previous surveys (between 2006 and 2008), however this species has since been delisted.

4.3.1 *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2)

This species is described as an erect, open shrub that grows up to 0.4m. It has white/pink flowers in October, and grows in red clay. It is found on gently undulating sandplains (WAHERB, 2012). This species was identified in one vegetation community' Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca*. This species was identified at a DEC known location within the Greater Flying Fox area. The GPS location of this species is provided in Appendix 6.



Plate 1: Image of *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2)

4.3.2 *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3)

This species is described as a straggly, erect shrub that grows up to 1.5 m high. It has pink flowers in June and it grows in yellow to orange sandy loam with laterite gravel. It can be found on gently undulating sandplains, low ridges and road verges. This species was identified within the Open shrub mallee of *E. eremophila* and *E. pileata* over low heath of mixed *Acacia* vegetation community. This species was identified at a DEC known location within the Greater Flying Fox area. The GPS location of this species is provided in Appendix 6.



Plate 2: Image of *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3)

4.3.3 *Boronia westringioides* (P2)

This species is described as an erect shrub that grows up to 0.2-0.75m high. It has pink flowers from July to September, and it grows in loamy sand. It can be found on plains (WAHERB, 2012). This species was identified in two vegetation communities, Heath of mixed *Acacia/Allocasuarina/ Melaleuca*; and Low scrub of mixed *Allocasuarina* over mixed dwarf scrub. There were three DEC locations of this species within the area two of which were confirmed by BC. An additional location of this species was identified by BC. The GPS location of this species is provided in Appendix 6.



Plate 3: Image of *Boronia westringioides* (P2)

4.3.4 *Daviesia elongata* subsp. *implexa* (P3)

This species is described as a spreading or sprawling shrub that grows up to 0.4-1m high. It has yellow/orange and red flowers in September and grows in sand and laterite (WAHERB, 2012). This species was identified in two vegetation communities: Heath of mixed *Acacia*, *Allocasuarina* and *Melaleuca*; and Low scrub of mixed *Allocasuarina* over mixed dwarf scrub. There was one DEC location of this species within the area which was confirmed by BC. An additional four locations of this species was identified by BC. The GPS location of this species is provided in Appendix 6.



Plate 4: Image of *Boronia westringioides* (P2)

4.3.5 *Dillwynia acerosa* (P3)

This species is described as a shrub that grows up to 0.5m high. It has yellow/red flowers in September, and grows in gravelly clay with laterite (WAHERB, 2012). This species was identified in only one vegetation community, Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca*. This species was identified at a DEC known location within the Greater Flying Fox area. The GPS location of this species is provided in Appendix 6.



Plate 5: Image of *Dillwynia acerosa* (P3)

4.3.6 *Eutaxia acanthoclada* (P3)

This species is described as a compact, mat-forming, prostrate shrub that grows up to 0.3m high. It has yellow/orange/red flowers from October to November. It grows in light brown sandy clay, shallow sandy loam, red clay over banded ironstone and gravel. It occurs on gently undulating plains (WAHERB, 2012). This species was identified in two vegetation communities: Low woodland of *E. salmonophloia* over low scrub of mixed *Melaleuca*; and Regrowth forest of *E. salmonophloia*/*E. salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*. There were no DEC known locations of this species within the Greater Flying Fox area. BC identified three locations of this species within the Greater Flying Fox area. The GPS locations of this species are provided in Appendix 6.



Plate 6: Image of *Eutaxia acanthoclada* (P3)

4.3.7 *Microcorys* sp. *Forrestania* (V. English 2004) (P4)

This species is described as a prostrate or erect shrub that grows up to 0.35-0.4m high. It has white/purple flowers in January or April. It grows in yellow sandy clay or red-brown clay, and it can be found in open woodland or cleared areas (WAHERB, 2012). This species was identified in four vegetation communities: Open shrub mallee of *E. eremophila* and *E. pileata* over low heath of mixed *Acacia*; Heath of mixed *Acacia/Allocasuarina/Melaleuca*; Open shrub mallee of *E. eremophila/E. calycogona/E. celastroides* over low heath of mixed *Melaleuca*; and Low woodland of *E. salmonophloia* over low scrub of mixed *Melaleuca*. There was one DEC known location of this species within the Greater Flying Fox area which was confirmed by BC. An additional 35 locations of this species were identified by BC within the Greater Flying Fox area. The GPS locations of this species are provided in Appendix 6.



Plate 7: Image of *Microcorys* sp. *Forrestania* (V. English 2004) (P4)

4.3.8 *Verticordia mitodes* (P3)

This species is described as a spreading shrub that grows between 0.15-0.7m high. It has pink-purple flowers from October to December or January. It grows in yellow sand and in undulating plains (WAHERB, 2012). This species was identified within the Low scrub of mixed *Allocasuarina* over mixed dwarf scrub vegetation community. One location of this species was recorded which is not a DEC known location. There are no known DEC locations of this species within a 10km radius of the survey area. The GPS location of this species is provided in Appendix 6.



Plate 8: Image of *Verticordia mitodes* (P3)

4.4 Fauna of Conservation Significance

An inactive *Leipoa ocellata* (malleefowl) mound was identified during the 2012 survey within the Heath of mixed *Acacia/Allocasuarina/Melaleuca* vegetation community. Malleefowl are listed as vulnerable under the *EPBC Act 1999*. The GPS location of this inactive Malleefowl mound is provided in Appendix 6.

4.5 Vegetation Communities

A total of ten broad vegetation communities were identified within the survey area. These included:

1. Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia/Melaleuca*;
2. Heath of mixed *Acacia/Allocasuarina/Melaleuca*;
3. Open shrub mallee of *Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides* over low heath of mixed *Melaleuca*;
4. Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca*;
5. Low scrub of mixed *Allocasuarina* over mixed dwarf scrub;
6. Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*, *Eucalyptus cylindriflora* and *Eucalyptus pileata*;
7. Heath of *Melaleuca hamata/Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora*;
8. Regrowth forest of *Eucalyptus salmonophloia/Eucalyptus salubris* over heath of *Melaleuca cucullata/Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis/Acacia acanthoclada*; and
9. Low woodland of *Eucalyptus polita/Eucalyptus platycorys/Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora/Acacia intricata*; and
10. Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise.

These ten vegetation communities were represented by a total of 43 Families, 98 Genera and 278 Species (including sub-species and variants). A map showing the vegetation communities present in the survey area is located in Appendix 3.

Table 7: Summary of Vegetation Communities and their areas

Vegetation Community	Area (ha)
Open shrub mallee of <i>Eucalyptus eremophila</i> and <i>Eucalyptus pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	257
Heath of mixed <i>Acacia/Allocasuarina/Melaleuca</i>	429
Open shrub mallee of <i>Eucalyptus eremophila/Eucalyptus calycogona/Eucalyptus celastroides</i> over low heath of mixed <i>Melaleuca</i>	124
Low woodland of <i>Eucalyptus salmonophloia</i> over low scrub of mixed <i>Melaleuca</i>	113
Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	106
Low woodland of <i>Eucalyptus salmonophloia</i> over mallee of <i>Eucalyptus cylindrocarpa</i> , <i>Eucalyptus cylindriflora</i> and <i>Eucalyptus pileata</i>	4
Heath of <i>Melaleuca hamata/Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	4
Regrowth forest of <i>Eucalyptus salmonophloia/Eucalyptus salubris</i> over heath of <i>Melaleuca cucullata/Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis/Acacia acanthoclada</i>	10
Low woodland of <i>Eucalyptus polita/Eucalyptus platycorys/Eucalyptus horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora/Acacia intricata</i>	0.2
Open tree mallee of <i>Eucalyptus eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise	1
Cleared Vegetation for Mining Operation	130
Total Area	1178

4.6 Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia/Melaleuca*

4.6.1 Flora

The flora recorded within this vegetation community was represented by 24 Families, 30 Genera and 133 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Two Priority Flora species were identified within this vegetation community; *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968 (P3) and *Microcorys* sp. Forrestania (V. English, 2004) (P4). No introduced species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.6.2 Vegetation

The flora recorded in this vegetation community was representative of Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia/Melaleuca* (Plate 9). The upper story species included *Eucalyptus eremophila*, *Eucalyptus flocktoniae* subsp. *flocktoniae*, *Eucalyptus horistes*, *Eucalyptus cylindrocarpa*, *Eucalyptus salmonophloia*, *Eucalyptus pileata* and *Eucalyptus urna*. The mid-storey species included *Melaleuca adnata*, *Melaleuca calyptroides*, *Melaleuca cordata*, *Melaleuca elliptica*, *Melaleuca hamata*, *Melaleuca lateriflora*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Santalum acuminatum*, *Phebalium filifolium*, *Daviesia nematophylla* and *Hakea corymbosa*. The understorey species included *Olearia muelleri*, *Sclerolaena diacantha*, *Wilsonia humilis*, *Gahnia ancistrophylla*, *Lepidosperma drummondii*, *Acacia deficiens*, *Acacia intricata*, *Dodonaea stenozyga*, *Grevillea huegelii* and *Thryptomene kochii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 8. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 8: Vegetation assemblage for Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia/Melaleuca* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee shrub form	10-30%	<i>Eucalyptus eremophila</i> <i>Eucalyptus pileata</i>
Shrub 0.5-1m	30-70%	<i>Melaleuca adnata</i> <i>Melaleuca calyptroides</i> <i>Melaleuca lateriflora</i> <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to the ANRA, covers 2% of WA (ANRA, 2012).



Plate 9: Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia*/*Melaleuca*

4.7 Heath of mixed *Acacia*/*Allocasuarina*/*Melaleuca*

4.7.1 Flora

The flora recorded within this vegetation community was represented by 31 Families, 66 Genera and 177 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Three Priority Flora species were identified within this vegetation community; *Boronia westringioides* (P2), *Daviesia elongata* subsp. *implexa* (P3) and *Microcorys* sp. Forresteria (V. English, 2004) (P4). No introduced species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.7.2 Vegetation

The flora recorded in this vegetation community was representative of Heath of mixed *Acacia*/*Allocasuarina*/*Melaleuca* (Plate 10). The species in the upper storey consisted of *Eucalyptus cylindrocarpa*, *Eucalyptus polita*, *Eucalyptus eremophila*, *Allocasuarina campestris* and *Allocasuarina corniculata*. The mid-storey species included *Acacia coolgardiensis*, *Acacia eremophila* var. *eremophila*, *Acacia fragilis*, *Acacia heteroneura* var. *jutsonii*, *Melaleuca hamata*, *Melaleuca laxiflora*, *Melaleuca cordata*, *Gastrolobium spinosum*, *Persoonia coriacea*, *Thryptomene kochii*, *Grevillea oncogyne*, *Leptospermum erubescens*, *Dodonaea attenuata* and *Hakea corymbosa*. The understorey

species included *Hibbertia ancistrophylla*, *Acacia deficiens*, *Grevillea huegelii*, *Lomandra effusa*, *Lepidosperma drummondii*, *Dianella revoluta*, *Astroloma serratifolium* and *Westringia cephalantha*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 9. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 9: Vegetation assemblage for Heath of mixed *Acacia/Allocasuarina/Melaleuca* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub 1.5-2mm	30-70%	<i>Allocasuarina campestris</i> <i>Allocasuarina corniculata</i>
Shrub 1-1.5m	30-70%	<i>Acacia eremophila</i> var. <i>eremophila</i> <i>Acacia fragilis</i> <i>Acacia heteroneura</i> var. <i>jutsonii</i> <i>Melaleuca cordata</i> <i>Melaleuca hamata</i> <i>Melaleuca laxiflora</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Heath vegetation community which, according to ANRA, covers .7% of WA (ANRA, 2012).



Plate 10: Heath of mixed *Acacia/Allocasuarina/Melaleuca*

4.8 Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca*

4.8.1 Flora

The flora recorded within this vegetation community was represented by 19 Families, 36 Genera and 82 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Three Priority Flora species: *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2); *Dillwynia acerosa* (P3); and *Microcorys* sp. Forrestania (V. English 2004) (P4) were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.8.2 Vegetation

The flora recorded in this vegetation community was representative of Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca* (Plate 11). The upper storey species included *Eucalyptus calycogona*, *Eucalyptus celastroides* subsp. *celastroides*, *Eucalyptus eremophila*, *Eucalyptus pileata* and *Eucalyptus salmonophloia*. The mid-storey species included *Melaleuca adnata*, *Melaleuca calyptroides*, *Melaleuca cordata*, *Melaleuca elliptica*, *Melaleuca hamata*, *Melaleuca lateriflora*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Santalum acuminatum*, *Phebalium filifolium*, *Allocasuarina decussata*, *Callitris preissii*, *Acacia hemiteles*, *Hakea multilineata* and *Exocarpos aphyllus*. The understorey species included *Wilsonia humilis*, *Gahnia ancistrophylla*, *Lepidosperma drummondii*, *Acacia deficiens*, *Acacia erinacea*, *Westringia cephalantha*, *Acacia intricata*, *Grevillea huegelii* and *Thryptomene kochii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 10. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 10: Vegetation assemblage for Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee shrub form	10-30%	<i>Eucalyptus calycogona</i> <i>Eucalyptus celastroides</i> <i>Eucalyptus eremophila</i>
Shrub 0.5-1m	30-70%	<i>Melaleuca adnata</i> <i>Melaleuca calyptroides</i> <i>Melaleuca cordata</i> <i>Melaleuca hamata</i> <i>Melaleuca lateriflora</i> <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 11: Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca*

4.9 Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca*

4.9.1 Flora

The flora recorded within this vegetation community was represented by 12 Families, 16 Genera and 32 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. One Priority Flora species, *Microcorys* sp. Forresteria (V. English 2004) (P4) were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.9.2 Vegetation

The flora recorded in this vegetation community was representative of Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca* (Plate 12). The species in the upper storey included *Eucalyptus salmonophloia*, *Eucalyptus calycogona*, *Eucalyptus celastroides* subsp. *celastroides* and *Eucalyptus salubris*. The mid-storey species included *Acacia hemiteles*, *Acacia sphacelata* subsp. *sphacelata*, *Scaevola spinescens*, *Melaleuca adnata*, *Melaleuca calyptroides*, *Melaleuca eleuterostachya*, *Santalum acuminatum* and *Eremophila densiflora*. The understorey species included *Calotis hispidula*, *Grevillea acuaria*, *Olearia muelleri*, *Wilsonia humilis*, *Acacia deficiens*, *Acacia erinacea*, *Acacia intricata*, *Daviesia microphylla* and *Westringia cephalantha*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 11. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 11: Vegetation assemblage for Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree 5-15m	10-30%	<i>Eucalyptus salmonophloia</i>
Shrub 1-1.5m	10-30%	<i>Melaleuca adnata</i> <i>Melaleuca calyptroides</i> <i>Melaleuca eleuterostachya</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodland vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 12: Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca*

4.10 Low scrub of mixed *Allocasuarina* over mixed dwarf scrub

4.10.1 Flora

The flora recorded within this vegetation community was represented by 16 Families, 37 Genera and 64 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. Two Priority Flora species; *Daviesia elongata* subsp. *implexa* (P3) and *Boronia westringioides* (P2) were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.10.2 Vegetation

The flora recorded in this vegetation community was representative of Low scrub of mixed *Allocasuarina* over mixed dwarf scrub (Plate 13). The upper storey species included *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus horistes*, *Eucalyptus horistes*, *Allocasuarina acutivalvis*, *Allocasuarina decussata* and *Eucalyptus platycorys*. The mid-storey species included *Leptospermum erubescens*, *Melaleuca calyptroides*, *Melaleuca cordata*, *Melaleuca glaberrima*, *Melaleuca hamata*, *Santalum acuminatum*, *Gastrolobium spinosum*, *Banksia cirsioides*, *Banksia elderiana* and *Hakea scoparia*. The understorey species included *Lomandra mucronata*, *Halgania lavandulacea*, *Lepidosperma* sp. A2 Inland Flat (G. J. Keighery 7000), *Lepidosperma drummondii*, *Goodenia pinifolia* and *Verticordia inclusa* subsp. *inclusa*. Dominant species from the vegetation assemblage, according to

Muir (1977), are shown in Table 12. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 12: Vegetation assemblage for Low scrub of mixed *Allocasuarina* over mixed dwarf scrub within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub 1.5-2m	10-30%	<i>Allocasuarina acutivalvis</i> <i>Allocasuarina decussata</i>
Shrub 0.5-1m	10-30%	<i>Banksia cirsioides</i> <i>Banksia elderiana</i> <i>Leptospermum erubescens</i> <i>Melaleuca calyptroides</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 13: Low scrub of mixed *Allocasuarina* over mixed dwarf scrub

4.11 Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*/*Eucalyptus cylindriflora*/*Eucalyptus pileata*

4.11.1 Flora

Flora recorded in the vegetation community was represented by 17 Families, 24 Genera and 52 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.11.2 Vegetation

The flora recorded in this vegetation community was representative of Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*/ *Eucalyptus cylindriflora*/ *Eucalyptus pileata* (Plate 14). The species in the upper storey included *Eucalyptus salmonophloia*, *Eucalyptus salubris*, *Eucalyptus urna* and *Eucalyptus melanoxydon*. The mid-storey included *Eucalyptus cylindrocarpa*, *Eucalyptus cylindriflora*, *Eucalyptus pileata*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Melaleuca adnata* and *Atriplex vesicaria*. The understorey species included *Daviesia benthamii*, *Acacia erinacea*, *Wilsonia humilis*, *Eremophila lonantha*, *Acacia deficiens*, *Dodonaea stenozyga*, *Exocarpos aphyllus* and *Grevillea huegelii*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 13. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 13: Vegetation assemblage for Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*/*Eucalyptus cylindriflora*/*Eucalyptus pileata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Trees 5-15m	10-30%	<i>Eucalyptus salmonophloia</i>
Mallee Tree Form	30-70%	<i>Eucalyptus cylindrocarpa</i> <i>Eucalyptus cylindriflora</i> <i>Eucalyptus pileata</i>
Shrubs 1-1.5m	10-30%	<i>Daviesia benthamii</i>
Shrubs 0-0.5m	10-30%	<i>Acacia erinacea</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



**Plate 14: Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*/
Eucalyptus cylindriflora/*Eucalyptus pileata* within the survey area**

4.12 Heath of *Melaleuca hamata*/*Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora*

4.12.1 Flora

Flora recorded in this vegetation community were represented by 13 Families, 33 Genera and 51 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.12.2 Vegetation

The flora recorded in this vegetation community was representative of Heath of *Melaleuca hamata*/*Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora* (Plate 15). The upper storey species included *Acacia lasiocalyx*, *Eucalyptus eremophila* and *Eucalyptus platycorys*. The mid-storey species included *Santalum acuminatum*, *Daviesia benthamii*, *Banksia elderiana*, *Acacia eremophila*, *Templetonia sulcata*, *Exocarpos aphyllus*, *Allocasuarina campestris*, *Hakea scoparia*, *Grevillea cagiana* and *Calothamnus quadrifidus*. The understorey species included *Leptospermum erubescens*, *Grevillea huegelii*, *Acacia intricata*, *Microcybe multiflora*, *Drummondita hassellii*, *Phebalium filifolium*, *Jacksonia nematoclada*, *Thryptomene kochii*, *Lomandra effusa* and *Gastrolobium spinosum*. Dominant species

from the vegetation assemblage, according to Muir (1977), are shown in Table 14. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 14: Vegetation assemblage for Heath of *Melaleuca hamata*/*Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Shrub 1.5-2m	30-70%	<i>Allocasuarina acutivalvis</i>
Shrub 1-1.5m	30-70%	<i>Melaleuca hamata</i>
Bunch Grass <0.5m	10-30%	<i>Lepidosperma</i> sp. A2 Inland Flat (G.J. Keighery 7000)
Shrub 0-0.5m	10-30%	<i>Microcybe multiflora</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Heath vegetation community which, according to ANRA, covers 1.5% of WA (ANRA, 2012).



Plate 15: Heath of *Melaleuca hamata*/*Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora*

4.13 Regrowth forest of *Eucalyptus salmonophloia*/*Eucalyptus salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*

4.13.1 Flora

Flora recorded in this vegetation community were represented by 18 Families, 24 Genera and 38 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. One Priority Flora species, *Eutaxia acanthoclada* (P3) was identified within this vegetation community. No introduced species were identified within this vegetation community.

4.13.2 Vegetation

The flora recorded in this vegetation community was representative of Regrowth forest of *Eucalyptus salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* (Plate 16). The species in the upper storey included *Eucalyptus urna*, *Eucalyptus salubris* and *Eucalyptus salmonophloia*. The mid-storey species included *Exocarpos aphyllus*, *Melaleuca adnata*, *Cassytha melantha*, *Melaleuca pauperiflora* subsp. *fastigiata*, *Santalum acuminatum*, *Acacia hemiteles*, *Melaleuca lateriflora*, *Eremophila ionantha*, *Acacia merrallii*, *Daviesia nematophylla* and *Melaleuca eleuterostachya*. The understorey species included *Acacia deficiens*, *Microcybe multiflora*, *Acacia sphacelata*, *Hybanthus floribundus*, *Cooperhooikia strophiolata*, *Eremophila decipiens*, *Grevillea huegelii*, *Olearia muelleri*, *Halgania andromedifolia* and *Cratystylis conocephala*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 15. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 15: Vegetation assemblage for Regrowth forest of *Eucalyptus salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree 5-15m	30-70% 10-30%	<i>Eucalyptus salubris</i> <i>Eucalyptus urna</i> <i>Eucalyptus salmonophloia</i>
Shrub 1-1.5m	30-70%	<i>Melaleuca cucullata</i> <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>
Shrub 0.5-1m	30-70%	<i>Dodonaea stenozyga</i>
Shrub 0-0.5m	2-10%	<i>Wilsonia humilis</i> <i>Acacia acanthoclada</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the *Eucalyptus* woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 16: Regrowth forest of *Eucalyptus salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*

4.14 Low woodland of *Eucalyptus polita*/*Eucalyptus platycorys*/*Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata*

4.14.1 Flora

Flora recorded in this vegetation community were represented by 16 Families, 29 Genera and 39 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.14.2 Vegetation

The flora recorded in this vegetation community was representative of Low woodland of *Eucalyptus polita*/*Eucalyptus platycorys*/*Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* (Plate 17). The upper story species included *Eucalyptus platycorys*, *Eucalyptus polita*, *Eucalyptus horistes*, *Eucalyptus salmonophloia* and *Allocasuarina acutivalvis*. The mid-storey species included *Callitris preissii*, *Cassytha melantha*, *Exocarpos aphyllus*, *Acacia eremophila*, *Hakea scoparia*, *Santalum acuminatum*, *Grevillea cagiana*, *Melaleuca lateriflora*

and *Melaleuca pauperiflora* subsp. *pauperiflora*. The understorey species included *Gastrolobium spinosum*, *Grevillea huegelii*, *Leptospermum erubescens*, *Melaleuca glaberrima*, *Acacia sphacelata* subsp. *sphacelata*, *Lepidosperma* sp. A2 Inland Flat (G.J. Keighery 7000), *Dianella revoluta* and *Hibbertia eatoniae*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 16. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 16: Vegetation assemblage for Low woodland of *Eucalyptus polita*/*Eucalyptus platycorys*/*Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata* within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Mallee Tree Form	10-30%	<i>Eucalyptus platycorys</i> <i>Eucalyptus polita</i> <i>Eucalyptus horistes</i>
Shrub 0.5-1m	30-70%	<i>Melaleuca hamata</i>
Shrub 0-0.5m	10-30%	<i>Acacia intricata</i> <i>Microcybe multiflora</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Eucalyptus woodlands vegetation community which, according to ANRA, covers 3.5% of WA (ANRA, 2012).



Plate 17: Low woodland of *Eucalyptus polita*/*Eucalyptus platycorys*/*Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata*

4.15 Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise

4.15.1 Flora

The flora recorded within this vegetation community was represented by 13 Families, 21 Genera and 43 Species (Appendix 4).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act* (1950), section 179 of the *EPBC Act* 1999 and as listed by the DEC (Atkins, 2012) was identified within this vegetation community. No Priority Flora species were identified within this vegetation community. No introduced species were identified within this vegetation community.

4.15.2 Vegetation

The flora recorded in this vegetation community was representative of Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise (Plate 18). The upper storey species was comprised of *Eucalyptus celastroides* subsp. *celastroides*, *Eucalyptus pluricaulis* subsp. *pluricaulis* and *Eucalyptus eremophila*. The mid-storey species included *Allocasuarina acutivalvis*, *Allocasuarina corniculata*, *Callitris preissii*, *Acacia hemiteles*, *Templetonia sulcata*, *Scaevola spinescens*, *Baeckea crispiflora*, *Melaleuca adnata*, *Melaleuca thyoides*, *Grevillea acuaria*, *Hakea scoparia* and *Santalum acuminatum*. The understorey species included *Olearia muelleri*, *Acacia erinacea*, *Gompholobium gompholobioides*, *Goodenia pinifolia*, *Westringia cephalantha* and *Hibbertia gracilipes*. Dominant species from the vegetation assemblage, according to Muir (1977), are shown in Table 17. The Muir Life Form and Height Class sheet is located in Appendix 7.

Table 17: Vegetation assemblage for Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise within the survey area (Muir, 1977)

Life Form/Height Class	Canopy Cover	Dominant species present
Tree Mallee form	10-30%	<i>Eucalyptus eremophila</i>
Shrub 1-1.5m	10-30%	<i>Melaleuca hamata</i>

No broad scale clearing for agricultural purposes has occurred in this vegetation community within the survey area.

This vegetation community is best represented by the Mallee woodlands and shrublands vegetation community which, according to ANRA, covers 2% of WA (ANRA, 2012).



Plate 18: Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise

4.16 Vegetation of Conservation Significance

The entire Greater Flying Fox area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. A description of the Lake Cronin Region according to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) and the EPA is provided below;

Lake Cronin is a semi-permanent freshwater lake located in the south western region of the Eastern Goldfields and is the largest freshwater lake in the region. The Lake Cronin area is one of a number of areas in the Wheatbelt region that are significant for rare species, due to widespread clearing in the surrounding landscape, and to the high diversity and level of local endemism. The Lake Cronin area supports extensive shrubland, sandplain and woodland environments, including excellent representation of a range of vegetation types that are now extensively cleared in the Wheatbelt and supports a high number of species that are disjunct. Disjunct populations are those that have become physically separated, resulting in minimal or no gene flow between them, and they are an important precursor to the development of new species. A number of species in Australia have separate eastern and western populations, and some have formed sub-species, reflecting important broader long-term processes such as sea level changes and climatic fluctuations. It also supports a number of species reaching the limit of their distribution range. The number of species at the edge of their range reflects the convergence in the area of the Avon, Mallee and Coolgardie Biogeographic regions.

According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. Lake Cronin is not formally protected under the Commonwealth *EPBC Act 1999*.

The Greater Flying Fox area lies within the Great Western Woodlands, an area recognised as the largest remaining area of intact Mediterranean-climate on Earth, and for its natural and cultural values and its natural resource-related productivity (DEC, 2010a). It is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

One vegetation community, Heath of mixed *Acacia/Allocasuarina/Melaleuca* has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contains an inactive malleefowl mound. Malleefowl are listed as vulnerable under the *EPBC Act 1999*. The GPS coordinates of this mound are provided in Appendix 6.

There were no TECs listed under Commonwealth legislation or as defined by the DEC located within the Greater Flying Fox area (DEC 2011b; DSEWPac, 2012). However, the entire Greater Flying Fox area is located within the North Ironcap region of the *Ironcap Hills Vegetation complexes* which is a Priority 3 Ecological Community (DEC, 2011b). The North Ironcap BIF is located approximately 5km north-west region of the Greater Flying Fox area and is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha. Results of a flora and vegetation survey conducted by BC within the Greater Northern Ironcap area (BC, 2012a) identified six vegetation communities within the proposed 'A' Class Nature Reserve:

1. Shrub mallee of *Eucalyptus eremophila* and *E. urna* over heath of *Daviesia nematophylla* & *Melaleuca adnata*;
2. Heath of *Allocasuarina campestris*/*Melaleuca hamata*/*Acacia eremophila* over dwarf scrub of *Borya constricta*;
3. Scrub of *Allocasuarina huegeliana* over heath of *Acacia multispicata*/*Acacia lasiocalyx* and dwarf scrub of *Borya constricta*/*Leptospermum erubescens*;
4. Low woodland of *E. salmonophloia* over open tree mallee of *E. cylindrocarpa*/*E. cylindriflora*/*E. pileata*;
5. Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop; and

6. Open tree mallee of *E. polita*/*E. salubris* over scrub of *Melaleuca pauperiflora* subsp. *pauperiflora* and heath of *Melaleuca adnata*/*Melaleuca lateriflora*.

The majority of the proposed 'A' Class Nature Reserve (approximately 60%) comprised of the Open tree mallee of *Eucalyptus livida* over heath of *Acacia steedmanii*/*Allocasuarina campestris* and low heath of *Phebalium ambiguum*/*Acacia sulcata* on rock outcrop vegetation community. Only one vegetation community identified within the North Ironcap proposed 'A' Class Nature Reserve was identified within the Greater Flying Fox area; Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*, *Eucalyptus cylindriflora* and *Eucalyptus pileata*.

None of the seven vegetation communities described by Newbey and Hnatiuk (1988) as unique to the Lake Johnston-Hyden area (breakaway complex, BIF complex, greenstone complex, *Acacia jennerae* tall shrubland, *Eucalyptus georgei* low woodland, *Eucalyptus* sp. HRN 5603 low woodland and *E. scypocalyx* Mallee) were identified within the Greater Flying Fox area.

4.17 Vegetation condition

Based on Keighery's vegetation health rating scale (1994), two of the ten vegetation communities within the Greater Flying Fox area were rated as being in 'good' health:

1. Open shrub mallee of *Eucalyptus eremophila* and *Eucalyptus pileata* over low heath of mixed *Acacia*/*Melaleuca*; and
2. Regrowth forest of *Eucalyptus salmonophloia*/*Eucalyptus salubris* over heath of *Melaleuca cucullata*/*Melaleuca pauperiflora* subsp. *pauperiflora* and open dwarf scrub of *Wilsonia humilis*/*Acacia acanthoclada*.

A 'good' health rating depicts that although the vegetation structure has been affected by multiple disturbances, in this instance as a result of mining, exploration activities (access tracks/gridlines etc.) and fire, it retains its basic structure and has ability to regenerate.

The remaining eight vegetation communities were rated as being in 'very good' health:

1. Heath of mixed *Acacia*/*Allocasuarina*/*Melaleuca*;
2. Open shrub mallee of *Eucalyptus eremophila*/*Eucalyptus calycogona*/*Eucalyptus celastroides* over low heath of mixed *Melaleuca*;
3. Low woodland of *Eucalyptus salmonophloia* over low scrub of mixed *Melaleuca*;
4. Low scrub of mixed *Allocasuarina* over mixed dwarf scrub;
5. Low woodland of *Eucalyptus salmonophloia* over mallee of *Eucalyptus cylindrocarpa*, *Eucalyptus cylindriflora* and *Eucalyptus pileata*;
6. Heath of *Melaleuca hamata*/*Allocasuarina acutivalvis* over dwarf scrub of *Microcybe multiflora*;

7. Low woodland of *Eucalyptus polita*/*Eucalyptus platycorys*/*Eucalyptus horistes* over low heath of *Melaleuca hamata* and dwarf scrub of *Microcybe multiflora*/*Acacia intricata*; and
8. Open tree mallee of *Eucalyptus eremophila* over low scrub of *Melaleuca hamata* on stony rise.

A 'very good' health rating indicates that vegetation is altered due to obvious signs of disturbance, in this instance as a result of exploration activities (access tracks/gridlines etc.).

4.18 Introduced Plant Species

No introduced species were recorded within the Greater Flying Fox area.

5 Relevant Legislation and Compliance with Recognised Standards

5.1 Commonwealth Legislation

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The aim of this Act is to protect matters of national environmental significance, and is used by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPoC) to list threatened species and ecological communities into categories based on the criteria set out in the Act (www.environment.gov.au/epbc/index.html). The Act provides a national environmental assessment and approval system for proposed developments and enforces strict penalties for unauthorised actions that may affect matters of national environmental significance.

The Greater Flying Fox area has national environmental significance under the *EPBC Act 1999* as it contains Threatened Fauna listed as vulnerable under the *EPBC Act 1999*.

5.2 State Legislation

Clearing of Native Vegetation

The *Environmental Protection (Clearing of Native Vegetation) Regulations WA 2004* establish that any clearing of native vegetation in Western Australia requires a permit from the DEC. Under Section 51A of the *WA Environmental Protection Act, 1986 (EP Act)* native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native vegetation, but not vegetation planted in a plantation or planted with commercial intent. Section 51A of the EP Act defines clearing as “...the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage to some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above”.

Regulation 6 of the 2004 Regulations defines ESA as “...the area covered by vegetation within 50 m of Rare Flora, to the extent to which the vegetation is continuous with the vegetation in which the Rare Flora is located”.

A clearing permit must be granted prior to any clearing within a minimum of 50 m surrounding all populations of Threatened/DRF. The area covered by a TEC is also considered an ESA wherein clearing cannot occur unless a clearing permit is granted. Exploration activities are exempt from the requirement for clearing permits if undertaken pursuant to a Mining Act approval, for example through a “Programme of Work” provided the area involved does not occur in an ESA.

The Greater Flying Fox area lies within the Lake Cronin ESA and is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Conservation and Land Management Act WA 1984

Under Section 33(2) of the *CALM Act 1984* land that is not formally reserved under the *CALM Act 1984* can be managed under the *CALM Act 1984* if it is not the subject of a management plan; or it is the subject of a management plan that, due to an exemption given under section 57A(2), was not prepared in accordance with section 56(2). The management of the land and its associated forest produce, fauna and flora shall be carried out in a manner that protects and conserves the value of the land to the culture and heritage of Aboriginal persons, in particular from any material adverse effect caused by entry on or the use of the land by other persons, the taking or removal of the land's fauna, flora or forest produce or adverse effect on the protection or conservation of the land's fauna and flora.

According to the EPA (2009) *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region*, an area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved.

Environmental Protection Act WA 1986

The *EP Act 1986* includes requirements relating to the protection of DRF and TEC, and to the assessment of applications for clearing permits. TEC are protected even where exemptions for a clearing permit may apply. The *EP Act 1986* enforces both financial and/or imprisonment penalties on those who unlawfully damage a TEC.

The Greater Flying Fox area does not contain any TEC or Threatened Flora as listed under the *EPBC Act 1999* and by the DEC (Atkins, 2012).

Wildlife Conservation Act WA 1950

The DEC uses the provisions of this Act to list flora taxa as protected and the level of protection assigned to such flora. Flora species are classified as DRF when their populations are geographically restricted or are threatened by local processes. Under this Act, all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) are protected throughout the State. Financial penalties pursuant to the Act can be imposed if threatened plant species are collected without an appropriate licence.

DEC Priority lists

The DEC lists 'Priority' flora species which are under consideration for declaration as Rare Flora. Species classed as Priority 1-3 are in urgent need of further survey, whereas Priority 4 species are considered to have been adequately surveyed but may become vulnerable or rare in future years. Priority 4 species are also species that have been removed from the threatened species list in the past 5 years. Priority 5 species are those species which are not currently threatened but are likely to become threatened within 5 years due to a specific conservation program.

The DEC also lists PEC as a mechanism for identifying communities that may need monitoring before possible nomination for TEC status. These priority species and communities have no formal legal protection until they are endorsed by the Minister as being Declared Rare Flora and TEC respectively.

Results from the DEC database searches revealed 12 locations of Priority Flora within the Greater Flying Fox area. Locations of seven of these species were identified by BC within the Greater Flying Fox area. An additional Priority Flora species not listed by the DEC was also identified within the Greater Flying Fox area. A total of three Threatened Flora and 50 Priority Flora species recorded within a 10km radius of the survey area. The Greater Flying Fox area is located within the North Ironcap region of the *Ironcap Hills Vegetation complexes*, which is listed by the DEC as a Priority 3 Ecological Community.

5.3 EPA Position Statements

The EPA develops Position Statements to inform the public about environmental issues facing Western Australia and the plans for the future to ensure protection and ecological sustainability of environmentally important ecosystems. It provides a set of principles to assist the public and decision-makers on their responsibilities for managing land with care. These principles also provide the basis for the Environmental Protection Authority to evaluate and report upon achieving environmental and ecological sustainability and the protection of natural resources.

Position Statement No. 2 *Environmental Protection of Native Vegetation in Western Australia* (EPA 2000) outlines EPA policy on the protection of native vegetation in Western Australia, particularly in the agricultural area. It identifies basic elements that the EPA should consider when assessing proposals that impact on biological diversity. These include comparison of all proposal options; avoidance of species and community extinctions; an expectation that implementing the proposal will not take a vegetation type below the “threshold level” of 30%; and that proponents should demonstrate that on- and off-site impacts can be managed.

According to DAFWA (2011), the Greater Flying Fox area occurs in pre-European Beard vegetation association Forrestania 511, 519 and 2048 in the Southern Cross (COO2) subregion, of which 99.80%, 100% and 99.60% of the original vegetation extent remains respectively. It also occurs in vegetation association Forrestania 519 and 2048 within the Western Mallee (MAL2) subregion, of which 97.57% and 98.52% of the original vegetation extent remains respectively.

Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection* establishes that the EPA has adopted the definition and principles of biological diversity as defined in the *National Strategy for the Conservation of Australia’s Biological Diversity* (Commonwealth of Australia, 1996), and has stipulated the following requirements:

- the quality of information and scope of field surveys should meet standards, requirements and protocols as determined and published by the EPA; and
- the IBRA regionalisations should be used as the largest unit for environmental impact assessment (EIA) decision-making in relation to the conservation of biodiversity.

Pursuant to the IBRA regionalisations, 26 bioregions in WA, which are affected by a range of different threatening processes and have varying levels of sensitivity to impact, have been identified. Terrestrial biological surveys should provide sufficient information to address both biodiversity conservation and ecological functional values within the context of proposals and the results of surveys should be publicly available.

The flora survey of the Greater Flying Fox area was planned and implemented as far as practicable according to the EPA Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004). Also, the IBRA regionalisations have been used in preparing the report to identify the conservation status of the area and identify the main threats to the biodiversity of plant species in the region.

5.4 Native Vegetation Clearing Principles

Based on the outcomes from the survey undertaken, as presented in this report, BC provides the following comments regarding the native vegetation clearing principles:

a. Native vegetation should not be cleared if it comprises a high level of biological diversity.

The woodlands of the Southern Cross subregion have a very high diversity of Eucalypts with as many as 170 species occurring within the subregion. The subregion also has a high diversity of Acacia species however most species (excluding Threatened and Priority Flora species) are wide ranging and usually occur in at least one, and often several, adjoining subregions (Cowan, 2001). With the exception of granite outcrops vegetation of the Western Mallee subregion is not considered to comprise of a high level of biodiversity however it does contain a high number of endemic species (Beecham & Danks, 2001).

b. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of rare flora.

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), were identified within the Greater Flying Fox area. The nearest DEC location of Threatened Flora is *Eucalyptus steedmanii* which is located approximately 300m south of the Greater Flying Fox Area.

- c. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of a threatened ecological community (TEC).**

No TEC listed under the *EPBC Act 1999* (DSEWPaC, 2012) or by the DEC (2011b) occur within the Greater Flying Fox area.

- d. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

According to DAFWA (2011), the Greater Flying Fox area occurs in pre-European Beard vegetation association Forrestania 511, Forrestania 519 and Forrestania 2048 in the Southern Cross (COO2) subregion, of which 99.80%, 100% and 99.60% of the original vegetation extent remains respectively. It also occurs in vegetation association Forrestania 519 and Forrestania 2048 in the Western Mallee (MAL2) subregion, of which 97.57% and 98.52% of the original vegetation extent remains respectively.

- e. Native vegetation should not be cleared if it is growing, in, or in association with, an environment associated with a watercourse or wetland.**

No vegetation communities identified within the Greater Flying Fox area was found to be growing in or in associated with a watercourse or wetland.

- f. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

The entire Greater Flying Fox area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. An area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area to protect the Lake Cronin catchment and areas of extensive sandplain and woodland vegetation located immediately east of the Wheatbelt, which represents vegetation communities and fauna habitats that have been extensively cleared and fragmented in the adjacent Wheatbelt. The North Ironcap BIF located approximately 5km north-west region of the Greater Flying Fox area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha. Exploration activities within the Greater Flying Fox area are not likely to impact on the conservation values of any existing or proposed Nature Reserves within the Lake Cronin/ North Ironcap Region.

6 Conclusions and Recommendations

6.1 Conclusions

A total of ten vegetation communities were identified within the Greater Flying Fox area. These ten vegetation communities were represented by a total of 43 Families, 98 Genera and 278 Species (including sub-species and variants).

No Threatened Flora species, pursuant to subsection (2) of section 23F of the *Wildlife Conservation Act (1950)*, the *EPBC Act 1999* and as listed by the DEC (Atkins, 2012), were identified within the Greater Flying Fox area. Eight Priority Flora species were identified within the Greater Flying Fox area:

1. *Baeckea* sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3);
2. *Baeckea* sp. North Ironcap (R.J. Cranfield 10580) (P2);
3. *Boronia westringioides* (P2);
4. *Daviesia elongata* subsp. *implexa* (P3);
5. *Dillwynia acerosa* (P3);
6. *Eutaxia acanthoclada* (P3);
7. *Microcorys* sp. Forrestania (V. English 2004); and
8. *Verticordia mitodes* (P3).

One of the vegetation communities has National Environmental Significance as defined by the Commonwealth *EPBC Act 1999* as it contained an inactive *Leipoa ocellata* (malleefowl) mound. Malleefowl are listed as vulnerable under the *EPBC Act 1999*. No TEC pursuant to Commonwealth legislation or listed by the DEC were recorded within the Greater Flying Fox area. The Greater Flying Fox area is however located within the North Ironcap PEC of the *Ironcap Hills Vegetation Complexes* which is listed by the DEC as a Priority 3 Ecological Community.

The entire Greater Flying Fox area lies within the Lake Cronin ESA and is located approximately 2.5km west of the Lake Cronin 'A' Class Nature Reserve. An area of 56,750ha within the mineralised greenstone belt in the Lake Cronin Region (encompassing the entire Greater Flying Fox area) is proposed to be managed under Section 33(2) of the *CALM Act 1984* but not formally reserved. A proposed 'C' Class Nature Reserve is also proposed in the surrounding area. The North Ironcap BIF located approximately 5km north-west region of the Greater Flying Fox area is proposed to be reserved in a small 'A' Class Nature Reserve, covering an area of 42.5ha. The Greater Flying Fox area is also located within a Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Based on Keighery's vegetation health rating scale (1994), two of the ten vegetation communities within the Greater Flying Fox area were rated as being in 'good' health. The remaining eight vegetation communities were rated as being in 'very good' health. No introduced species was identified within the Greater Flying Fox area.

6.2 Recommendations

- No clearing within the Greater Flying Fox area is permitted until a clearing permit has been granted as the Greater Flying Fox area is located within a proposed managed land under Section 33(2) of the *CALM Act 1984*; Schedule 1 Area, as described in Regulation 6 and Schedule 1, clause 4 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*; ESA and contains Threatened Fauna.
- Consultation with the DEC is recommended prior to any clearing within the Greater Flying Fox area as it occurs within the boundary of a PEC. Although PEC's are not formally protected they are of conservation significance and are being considered to be formally protected under the *EPBC Act 1999* as TEC's.
- As Threatened Fauna and Priority Flora have been identified within the Greater Flying Fox area, targeted searches of all proposed areas to be cleared should be conducted prior to any clearing.
- No disturbance within a 50m radius of the inactive malleefowl is permitted. Should disturbance within this radius be unavoidable consultation with the DEC is recommended.
- Disturbance to Priority Flora identified within survey should be avoided. If disturbance is unavoidable an application to impact Priority Flora must be submitted to the DEC.

7 **References**

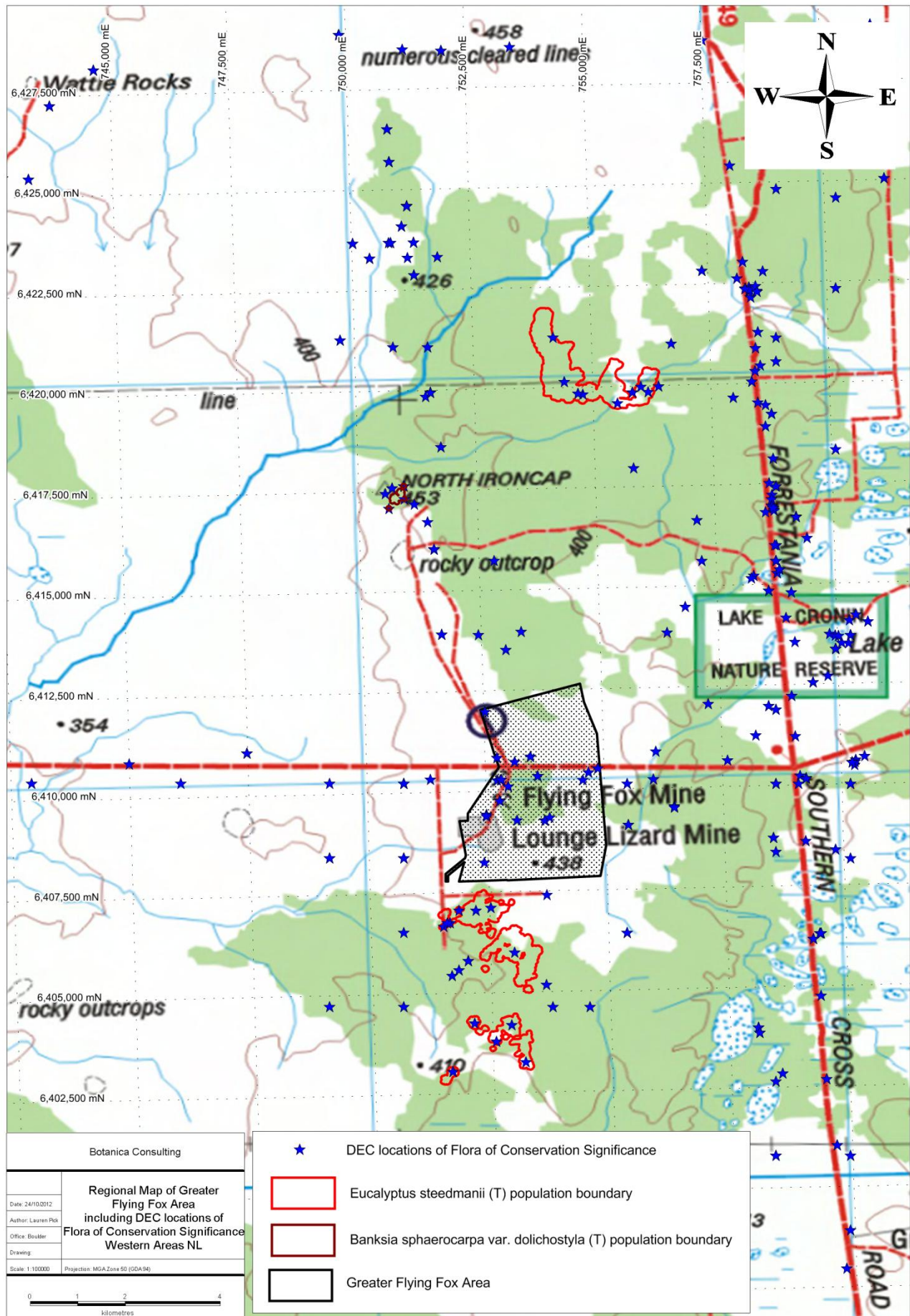
- ANRA, (2012), *Australian Natural Resources Atlas (ANRA)*, Australian Government
<http://www.anra.gov.au/topics/vegetation/extent/wa/index.html>
Accessed 05/09/2012
- Atkins, K., (2012), *Declared Rare and Priority Flora List for Western Australia*, Department of Environment and Conservation.
- Beard, J.S., (1990), *Plant Life of Western Australia*, Kangaroo Press Pty Ltd, NSW.
- Beecham, B. and Danks, A., (2001) *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2001- Mallee Subregion (MAL2 – Western Mallee subregion)*, Department of Conservation and Land Management.
- Beeston, G., Hopkins, A. and Shepherd, D., (2002), *Land-Use and Vegetation in Western Australia- National Land and Water Resources Audit Report*, Department of Agriculture Western Australia
- BC, (2006), *Flora and Vegetation Survey of the Flying Fox North East Exploration Area, Prepared for Western Areas*, Botanica Consulting
- BC, (2007a), *Vegetation Survey of a Proposed Extension to the Current Clearing Permit Number 691/1 at the Flying Fox mine site, Prepared for Western Areas*, Botanica Consulting
- BC, (2007b), *Flora and Vegetation Survey within the Greater Flying Fox mine site, prepared for Western Areas*, Botanica Consulting
- BC, (2008), *Vegetation Survey of New Morning to Spotted Quoll Area within Tenements M77/583 and M77/545*, Botanica Consulting
- BC, (2009), *Flora and Vegetation Survey within the lounge Lizard/Flying Fox area, Proposed Gravel Pit, Prepared for Western Areas*, Botanica Consulting
- BC, (2010a), *New Morning Flora and Vegetation Survey Prepared for Western Areas*, Botanica Consulting
- BC, (2010b), *New Morning Flora and Vegetation Survey Prepared for Western Areas*, Botanica Consulting
- BC, (2011a), *Spotted Quoll/Cosmic Boy Haul Road Flora and Vegetation Survey, Prepared for Western Areas NL*, Botanica Consulting
- BC, (2011), *Level 1 Flora and Vegetation Survey of Beautiful Sunday, Prepared for Western Areas*, Botanica Consulting
- BOM, (2012), *Lake Carmody weather station (#10670) 1905-2012*, Bureau of Meteorology.
http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=10670
- Cowan M, Graham G & McKenzie N, (2001), *A Biodiversity Audit of Western Australia's 53 Biogeographical Region in 2002- Southern Cross Subregion*, Department of Conservation and Land Management.
- DAFWA, (2011), *Pre-European Vegetation - Western Australia (NVIS Compliant Version GIS file)*, Department of Agriculture and Food Western Australia
- DEC, (2010a), *A biodiversity and cultural conservation strategy for the Great Western Woodlands*, Department of Environment and Conservation.

- DEC, (2011a), *Threatened Flora Database search results*, Department of Environment and Conservation
Requested September 2011
- DEC, (2011b), *TEC and PEC search*, Department of Environment and Conservation
Requested August 2011
- DSEWPaC, (2012), *Protected Matters Search Tool, Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment Water Heritage and the Arts.
http://www.environment.gov.au/cgi-bin/erin/ert/ert_dispatch.pl?loc_type=coordinate&search=Search&report=epbc
Accessed 24/10/2012
- EPA, (2000), Position Statement No. 2 *Environmental Protection of Native Vegetation in Western Australia*, Environmental Protection Authority
- EPA, (2002), Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection*, Environmental Protection Authority
- EPA, (2004), Guidance for the Assessment of Environmental Factors (in accordance with the *Environmental Protection Act 1986*), *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*, Environmental Protection Authority
- EPA, (2009), *Advice on Conservation Values and Review of Nature Reserve Proposals in the Lake Cronin Region: Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the Environmental Protection Act 1986*. Environmental Protection Authority Report 1329 June 2009.
- Grieve, B.J., (1998), *How to know Western Australian Wildflowers – A key to the flora of the extratropical regions of Western Australia Part II*, University of Western Australia Press, Nedlands, WA
- How, R. A Newbey, K.R Dell, J. Muir, B.G & Hnatiuk, R.J, (1988), *The Biological survey of the Eastern Goldfields of Western Australia*. Western Australian Museum Supplement No. 30.
- IBRA, (2012), *Interim Biogeographic Regionalisation for Australia (IBRA), Version 6.1*, Department of the Environment, Water, Heritage and the Arts.
<http://www.environment.gov.au/metadataexplorer/explorer.jsp>
Accessed: 21/09/2011
- JSWT, (2006a), *North Flying Fox Drill Lines Flora Survey for Western Areas*, Jim's Seeds, Weeds & Trees
- JSWT, (2006b), *Vegetation Survey of three Proposed Monitoring Bores in the Flying Fox Area prepared for Western Areas*, Jim's Seeds, Weeds & Trees
- Keighery, B. J., (1994), *Bushland Plant Survey: A guide to plant community survey for the community*. Wildflower Society of Western Australia (Inc.), Nedlands
- Mitchell, A. & Wilcox, D. G. (1988), *Arid Shrubland Plants of Western Australia*, University of Western Australia Press, Nedlands, WA.
- Muir, B. G., (1977), Biological Survey of the Western Australian Wheatbelt. Pt 2. Vegetation and habitat of the Bendering Reserve. *Rec. West. Aust. Mus. Suppl.* 3.
- WAHERB, (2012), *Florabase – Information on the Western Australian Flora*, Department of Environment and Conservation.
<http://florabase.dec.wa.gov.au>
Accessed 25/10/2012

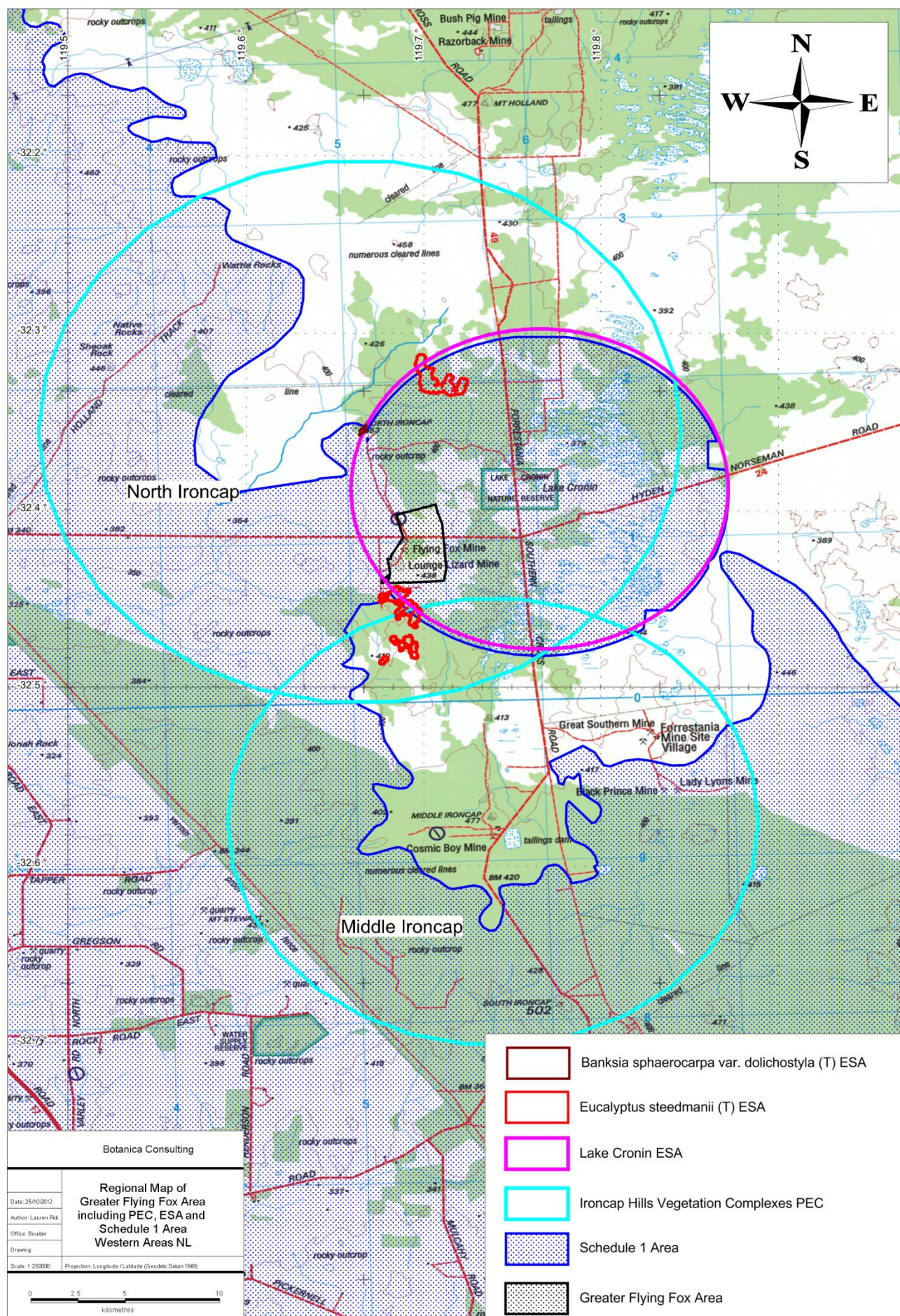
Watson, A., Judd, S., Watson J., Lam, A. and Mackenzie, D., (2008) *The Extraordinary Nature of The Great Western Woodlands*. The Wilderness Society of WA.

8 Appendices

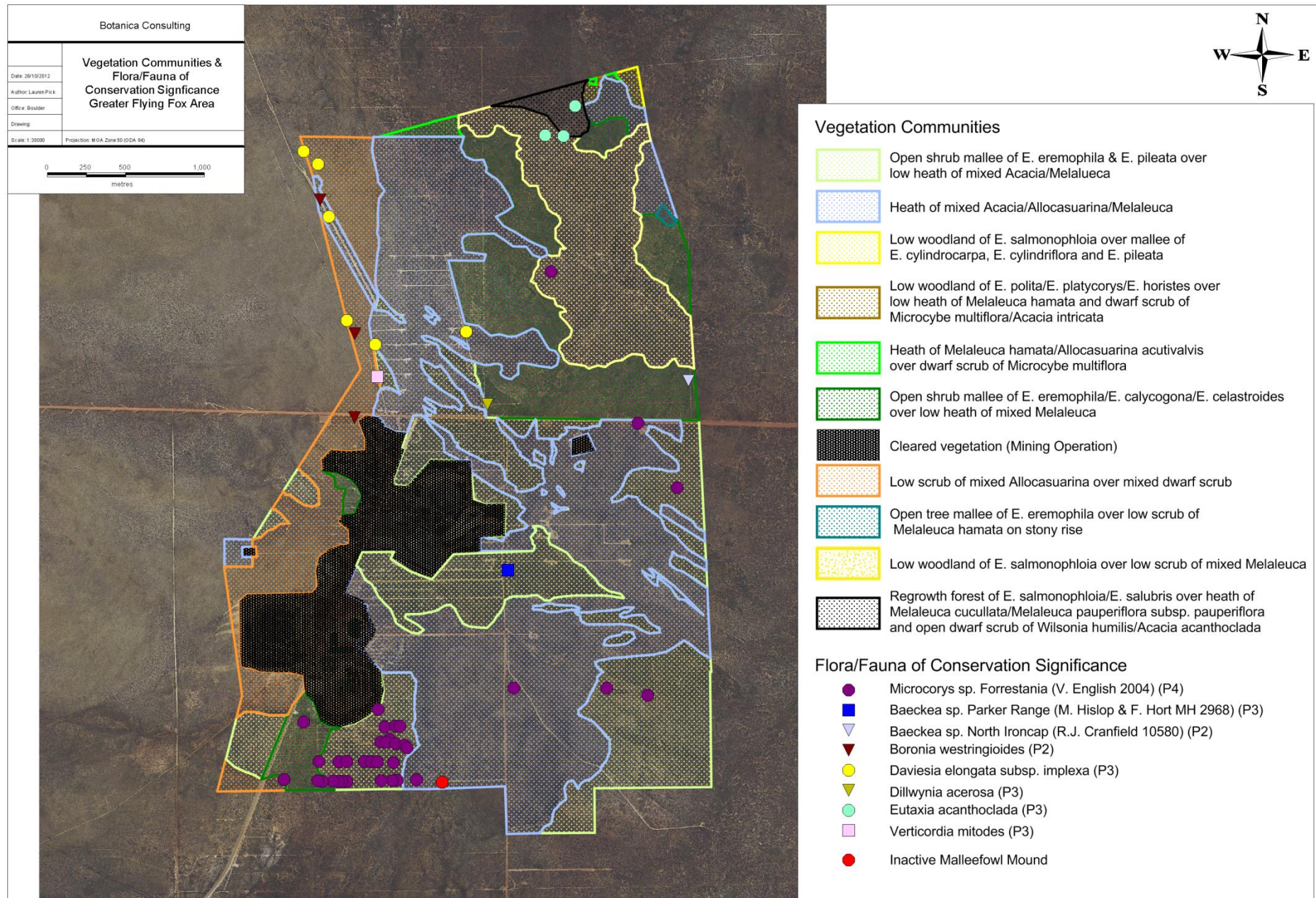
Appendix 1: Regional map of the Greater Flying Fox area including DEC Flora of Conservation Significance locations (area not to scale).



Appendix 2: Regional map of the Greater Flying Fox area including PEC, Lake Cronin ESA & Schedule 1 Area (area not to scale).



Appendix 3: Vegetation map of the Greater Flying Fox area including Flora of Conservation Significance



Appendix 4: List of species identified within each vegetation community

Red Text (P) denotes Priority Flora species (WAHERB, 2012); *previously called *Melaleuca pentagona*; **no longer Priority Flora (WAHERB, 2012).

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia</i> / <i>Melaleuca</i>	Heath of mixed <i>Acacia</i> / <i>Allocasuarina</i> / <i>Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Apiaceae	<i>Platysace</i>	<i>deflexa</i>		*								
Apiaceae	<i>Platysace</i>	<i>effusa</i>	*		*							
Apiaceae	<i>Platysace</i>	<i>maxwellii</i>	*									
Asparagaceae	<i>Lomandra</i>	<i>effusa</i>		*			*		*			
Asparagaceae	<i>Lomandra</i>	<i>mucronata</i>		*			*					
Asteraceae	<i>Calotis</i>	<i>hispidula</i>				*						
Asteraceae	<i>Cratystylis</i>	<i>conocephala</i>								*		
Asteraceae	<i>Olearia</i>	<i>dampieri</i> subsp. <i>eremicola</i>		*								
Asteraceae	<i>Olearia</i>	<i>lanuginosa</i>			*							
Asteraceae	<i>Olearia</i>	<i>muelleri</i>	*	*		*		*		*		*
Asteraceae	<i>Phebalium</i>	<i>ambiguum</i>		*								
Asteraceae	<i>Senecio</i>	<i>quadridentatus</i>								*		
Boraginaceae	<i>Halgania</i>	<i>andromedifolia</i>	*	*				*		*		
Boraginaceae	<i>Halgania</i>	<i>lavandulacea</i>					*					
Boryaceae	<i>Borya</i>	<i>constricta</i>		*								
Brassicaceae	<i>Stenopetalum</i>	<i>filifolium</i> (A)								*		
Casuarinaceae	<i>Allocasuarina</i>	<i>acutivalvis</i>		*	*		*		*		*	*
Casuarinaceae	<i>Allocasuarina</i>	<i>campestris</i>	*	*					*			
Casuarinaceae	<i>Allocasuarina</i>	<i>corniculata</i>	*	*								*
Casuarinaceae	<i>Allocasuarina</i>	<i>decussata</i>		*	*		*					
Casuarinaceae	<i>Allocasuarina</i>	<i>humilis</i>		*								
Casuarinaceae	<i>Allocasuarina</i>	<i>microstachya</i>		*			*					
Chenopodiaceae	<i>Atriplex</i>	<i>vesicaria</i>						*				
Chenopodiaceae	<i>Chenopodium</i>	<i>curvispicatum</i>						*				
Chenopodiaceae	<i>Maireana</i>	<i>pyramidata</i>		*								

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Chenopodiaceae	<i>Rhagodia</i>	<i>preissii</i> subsp. <i>preissii</i>		*								
Chenopodiaceae	<i>Sclerolaena</i>	<i>diacantha</i>	*									
Chenopodiaceae	<i>Sclerolaena</i>	<i>uniflora</i>						*				
Convolvulaceae	<i>Wilsonia</i>	<i>humilis</i>	*		*	*		*		*		
Cupressaceae	<i>Callitris</i>	<i>canescens</i>	*									
Cupressaceae	<i>Callitris</i>	<i>preissii</i>	*	*	*		*				*	*
Cyperaceae	<i>Gahnia</i>	<i>ancistrophylla</i>	*	*	*							
Cyperaceae	<i>Lepidosperma</i>	<i>drummondii</i>	*	*	*		*					
Cyperaceae	<i>Lepidosperma</i>	sp. A2 Inland Flat (G.J. Keighery 7000)	*	*	*		*		*		*	
Cyperaceae	<i>Lepidosperma</i>	<i>viscidum</i>	*	*								
Cyperaceae	<i>Schoenus</i>	<i>brevisetis</i>							*			
Dasypogonaceae	<i>Calectasia</i>	<i>grandiflora</i> subsp. Wheatbelt (A.M. Coates 4315)					*					
Dilleniaceae	<i>Hibbertia</i>	<i>ancistrophylla</i>		*								
Dilleniaceae	<i>Hibbertia</i>	<i>eatoniae</i>							*		*	
Dilleniaceae	<i>Hibbertia</i>	<i>gracilipes</i>	*	*								*
Dilleniaceae	<i>Hibbertia</i>	<i>pungens</i>	*	*								
Droseraceae	<i>Drosera</i>	<i>macrantha</i>							*			
Ericaceae	<i>Astroloma</i>	<i>epacridis</i>	*	*								
Ericaceae	<i>Astroloma</i>	<i>serratifolium</i>	*	*			*					
Ericaceae	<i>Leucopogon</i>	<i>cuneifolius</i>		*								
Ericaceae	<i>Leucopogon</i>	<i>dielsianus</i>		*					*			
Ericaceae	<i>Leucopogon</i>	sp. Coujinup (Burgman 1085)	*	*								
Ericaceae	<i>Leucopogon</i>	<i>conostephioides</i>					*					
Ericaceae	<i>Leucopogon</i>	sp. Wheatbelt (S. Murray 257)					*				*	
Ericaceae	<i>Lysinema</i>	<i>ciliatum</i>	*	*			*		*			
Euphorbiaceae	<i>Bertya</i>	<i>dimerostigma</i>		*								
Euphorbiaceae	<i>Bertya</i>	<i>virgata</i>									*	
Euphorbiaceae	<i>Beyeria</i>	<i>brevifolia</i>										*
Fabaceae	<i>Acacia</i>	<i>acanthoclada</i>						*		*		*

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Fabaceae	<i>Acacia</i>	<i>assimilis</i>							*		*	
Fabaceae	<i>Acacia</i>	<i>assimilis</i> subsp. <i>atroviridis</i>	*				*					
Fabaceae	<i>Acacia</i>	<i>binata</i>			*							
Fabaceae	<i>Acacia</i>	<i>brachyclada</i>		*								
Fabaceae	<i>Acacia</i>	<i>camptoclada</i>										*
Fabaceae	<i>Acacia</i>	<i>coolgardiensis</i>		*								
Fabaceae	<i>Acacia</i>	<i>deficiens</i>	*	*	*	*		*		*	*	*
Fabaceae	<i>Acacia</i>	<i>densiflora</i>		*								
Fabaceae	<i>Acacia</i>	<i>effusifolia</i>		*								
Fabaceae	<i>Acacia</i>	<i>eremophila</i> var. <i>eremophila</i>	*	*					*		*	
Fabaceae	<i>Acacia</i>	<i>erinacea</i>	*	*	*	*	*	*		*		*
Fabaceae	<i>Acacia</i>	<i>fragilis</i>	*	*	*							
Fabaceae	<i>Acacia</i>	<i>hemiteles</i>	*	*	*	*		*		*	*	*
Fabaceae	<i>Acacia</i>	<i>heteroneura</i> var. <i>jutsonii</i>		*								
Fabaceae	<i>Acacia</i>	<i>intricata</i>	*		*	*		*	*	*	*	
Fabaceae	<i>Acacia</i>	<i>jennerae</i>	*									
Fabaceae	<i>Acacia</i>	<i>lasiocalyx</i>	*						*			
Fabaceae	<i>Acacia</i>	<i>leptopetala</i>		*	*							
Fabaceae	<i>Acacia</i>	<i>longispinea</i>	*									
Fabaceae	<i>Acacia</i>	<i>merrallii</i>	*					*		*		
Fabaceae	<i>Acacia</i>	<i>poliochroa</i>	*			*						
Fabaceae	<i>Acacia</i>	<i>rendlei</i>						*				
Fabaceae	<i>Acacia</i>	<i>sphacelata</i>		*								
Fabaceae	<i>Acacia</i>	<i>sphacelata</i> subsp. <i>sphacelata</i>	*	*	*	*		*		*	*	
Fabaceae	<i>Acacia</i>	<i>sulcata</i> var. <i>platyphylla</i>	*		*				*			
Fabaceae	<i>Daviesia</i>	<i>benthamii</i>	*	*	*	*	*	*				
Fabaceae	<i>Daviesia</i>	<i>brachyphylla</i>					*					
Fabaceae	<i>Daviesia</i>	<i>elongata</i> subsp. <i>implexa</i> (P3)		*			*					
Fabaceae	<i>Daviesia</i>	<i>lancifolia</i>	*	*			*					
Fabaceae	<i>Daviesia</i>	<i>microphylla</i>				*						

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Fabaceae	<i>Daviesia</i>	<i>nematophylla</i>	*	*				*	*	*		
Fabaceae	<i>Daviesia</i>	<i>pachyloma</i>		*								
Fabaceae	<i>Dillwynia</i>	<i>acerosa</i> (P3)			*							
Fabaceae	<i>Dillwynia</i>	<i>uncinata</i>		*								
Fabaceae	<i>Eutaxia</i>	<i>acanthoclada</i> (P3)				*				*		
Fabaceae	<i>Gastrolobium</i>	<i>melanocarpum</i>		*					*			
Fabaceae	<i>Gastrolobium</i>	<i>spinosum</i>	*	*			*		*		*	
Fabaceae	<i>Gastrolobium</i>	<i>tetragonophyllum</i>										*
Fabaceae	<i>Gastrolobium</i>	<i>trilobum</i>		*								
Fabaceae	<i>Gompholobium</i>	<i>gompholobioides</i>										*
Fabaceae	<i>Jacksonia</i>	<i>nematoclada</i>							*			
Fabaceae	<i>Otion</i>	<i>tortile</i>			*							
Fabaceae	<i>Senna</i>	<i>artemisioides</i> subsp. <i>filifolia</i>	*	*								
Fabaceae	<i>Templetonia</i>	<i>egena</i>	*	*								
Fabaceae	<i>Templetonia</i>	<i>sulcata</i>						*	*			*
Geraniaceae	<i>Pelargonium</i>	<i>havlasae</i>								*		
Goodeniaceae	<i>Cooperhooikia</i>	<i>strophiolata</i>	*	*	*					*		
Goodeniaceae	<i>Dampiera</i>	<i>angulata</i>		*								
Goodeniaceae	<i>Dampiera</i>	<i>angulata</i> subsp. <i>angulata</i>	*									
Goodeniaceae	<i>Dampiera</i>	<i>eriocephala</i>	*	*								
Goodeniaceae	<i>Goodenia</i>	<i>pinifolia</i>	*	*			*					*
Goodeniaceae	<i>Goodenia</i>	<i>viscida</i>	*	*	*	*						
Goodeniaceae	<i>Scaevola</i>	<i>spinescens</i>				*		*				*
Gyrostemonaceae	<i>Gyrostemon</i>	<i>racemiger</i>	*	*								
Haloragaceae	<i>Glischrocaryon</i>	<i>roei</i>					*					
Haloragaceae	<i>Haloragis</i>	<i>hamata</i>								*		
Hemerocallidaceae	<i>Dianella</i>	<i>revoluta</i> var. <i>divaricata</i>		*				*			*	
Lamiaceae	<i>Microcorys</i>	<i>exserta</i>					*					
Lamiaceae	<i>Microcorys</i>	<i>pimeleoides</i> **		*								
Lamiaceae	<i>Microcorys</i>	sp. <i>Forrestania</i> (V. English 2004) (P4)	*	*	*	*						

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Lamiaceae	<i>Westringia</i>	<i>cephalantha</i>	*	*	*	*						*
Lamiaceae	<i>Westringia</i>	<i>rigida</i>			*	*						
Lauraceae	<i>Cassythia</i>	<i>glabella</i>	*	*								
Lauraceae	<i>Cassythia</i>	<i>melantha</i>	*	*	*			*		*	*	*
Myrtaceae	<i>Baeckea</i>	<i>aff. crispiflora</i>	*	*	*		*					*
Myrtaceae	<i>Baeckea</i>	<i>recurva</i>	*									
Myrtaceae	<i>Baeckea</i>	sp. (sterile)	*	*								
Myrtaceae	<i>Baeckea</i>	sp. North Ironcap (R.J. Cranfield 10580) (P2)			*							
Myrtaceae	<i>Baeckea</i>	sp. Parker Range (M. Hislop & F. Hort MH 2968) (P3)	*									
Myrtaceae	<i>Balaustion</i>	<i>pulcherrimum</i>					*		*			
Myrtaceae	<i>Beaufortia</i>	<i>interstans</i>		*			*		*			
Myrtaceae	<i>Beaufortia</i>	<i>schaueri</i>		*			*					
Myrtaceae	<i>Calothamnus</i>	<i>quadrididus</i>	*						*			
Myrtaceae	<i>Calytrix</i>	<i>leschenaultii</i>			*							
Myrtaceae	<i>Calytrix</i>	<i>breviseta</i>		*								
Myrtaceae	<i>Calytrix</i>	<i>breviseta</i> subsp. <i>stipulosa</i>	*	*								
Myrtaceae	<i>Calytrix</i>	<i>duplistipulata</i>		*								
Myrtaceae	<i>Calytrix</i>	<i>merrelliana</i>					*					
Myrtaceae	<i>Calytrix</i>	<i>violacea</i>		*								
Myrtaceae	<i>Cyathostemon</i>	<i>tenuifolius</i>		*					*			
Myrtaceae	<i>Darwinia</i>	<i>inconspicua</i>	*	*	*		*					
Myrtaceae	<i>Eucalyptus</i>	<i>calycogona</i>			*	*						
Myrtaceae	<i>Eucalyptus</i>	<i>celastroides</i>						*				
Myrtaceae	<i>Eucalyptus</i>	<i>celastroides</i> subsp. <i>celastroides</i>			*	*						*
Myrtaceae	<i>Eucalyptus</i>	<i>cylindriflora</i>						*				
Myrtaceae	<i>Eucalyptus</i>	<i>cylindrocarpa</i>	*	*				*				
Myrtaceae	<i>Eucalyptus</i>	<i>eremophila</i>	*	*				*	*			*
Myrtaceae	<i>Eucalyptus</i>	<i>eremophila</i> subsp. <i>eremophila</i>		*	*		*					

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Myrtaceae	<i>Eucalyptus</i>	<i>flocktoniae</i> subsp. <i>flocktoniae</i>	*	*								
Myrtaceae	<i>Eucalyptus</i>	<i>gracilis</i>						*				
Myrtaceae	<i>Eucalyptus</i>	<i>horistes</i>	*	*			*				*	
Myrtaceae	<i>Eucalyptus</i>	<i>livida</i>						*				
Myrtaceae	<i>Eucalyptus</i>	<i>luteola</i>			*							
Myrtaceae	<i>Eucalyptus</i>	<i>melanoxylon</i>						*				
Myrtaceae	<i>Eucalyptus</i>	<i>pileata</i>	*	*	*			*				
Myrtaceae	<i>Eucalyptus</i>	<i>platycorys</i>		*			*		*		*	
Myrtaceae	<i>Eucalyptus</i>	<i>pluricaulis</i> subsp. <i>pluricaulis</i>										*
Myrtaceae	<i>Eucalyptus</i>	<i>polita</i>	*	*							*	
Myrtaceae	<i>Eucalyptus</i>	<i>salmonophloia</i>	*		*	*		*		*	*	
Myrtaceae	<i>Eucalyptus</i>	<i>salubris</i>	*			*		*		*		
Myrtaceae	<i>Eucalyptus</i>	<i>sheathiana</i>	*									
Myrtaceae	<i>Eucalyptus</i>	sp. (sterile)	*									
Myrtaceae	<i>Eucalyptus</i>	<i>sporadica</i>	*									
Myrtaceae	<i>Eucalyptus</i>	<i>transcontinentalis</i>			*							
Myrtaceae	<i>Eucalyptus</i>	<i>urna</i>	*					*		*		
Myrtaceae	<i>Leptospermum</i>	<i>erubescens</i>	*	*	*		*	*	*		*	
Myrtaceae	<i>Leptospermum</i>	<i>roei</i>		*								
Myrtaceae	<i>Leptospermum</i>	<i>spinescens</i>	*	*					*			
Myrtaceae	<i>Melaleuca</i>	<i>acuminata</i>			*			*				
Myrtaceae	<i>Melaleuca</i>	<i>adnata</i>	*	*	*	*		*		*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>calyptroides</i> *	*	*	*	*	*					
Myrtaceae	<i>Melaleuca</i>	<i>cordata</i>	*	*	*		*		*			
Myrtaceae	<i>Melaleuca</i>	<i>cucullata</i>	*	*	*			*		*		
Myrtaceae	<i>Melaleuca</i>	<i>eleuterostachya</i>	*		*	*				*		*
Myrtaceae	<i>Melaleuca</i>	<i>elliptica</i>	*	*	*	*						
Myrtaceae	<i>Melaleuca</i>	<i>glaberrima</i>	*	*	*		*				*	
Myrtaceae	<i>Melaleuca</i>	<i>hamata</i>	*	*	*		*		*		*	*

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Myrtaceae	<i>Melaleuca</i>	<i>lateriflora</i>	*		*			*			*	*
Myrtaceae	<i>Melaleuca</i>	<i>laxiflora</i>	*	*					*	*		
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>fastigiata</i>	*	*	*			*		*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>pauperiflora</i> subsp. <i>pauperiflora</i>	*	*	*	*		*		*	*	*
Myrtaceae	<i>Melaleuca</i>	<i>phoidophylla</i>	*	*								
Myrtaceae	<i>Melaleuca</i>	<i>radula</i>			*							
Myrtaceae	<i>Melaleuca</i>	<i>sapientes</i>	*	*								
Myrtaceae	<i>Melaleuca</i>	sp. (sterile)		*								
Myrtaceae	<i>Melaleuca</i>	<i>sparsiflora</i>	*	*								
Myrtaceae	<i>Melaleuca</i>	<i>teuthidoides</i>	*	*	*							
Myrtaceae	<i>Melaleuca</i>	<i>thyoides</i>			*							*
Myrtaceae	<i>Melaleuca</i>	<i>uncinata</i>	*	*	*							
Myrtaceae	<i>Melaleuca</i>	<i>villosisepala</i>		*								
Myrtaceae	<i>Micromyrtus</i>	<i>erichsenii</i>	*									
Myrtaceae	<i>Micromyrtus</i>	<i>obovata</i>	*	*								
Myrtaceae	<i>Thryptomene</i>	<i>kochii</i>	*	*	*				*			
Myrtaceae	<i>Verticordia</i>	<i>acerosa</i> subsp. <i>preissii</i>		*								
Myrtaceae	<i>Verticordia</i>	<i>chrysantha</i>		*	*							
Myrtaceae	<i>Verticordia</i>	<i>chrysanthella</i>		*								
Myrtaceae	<i>Verticordia</i>	<i>inclusa</i>		*								
Myrtaceae	<i>Verticordia</i>	<i>inclusa</i> subsp. <i>inclusa</i>					*					
Myrtaceae	<i>Verticordia</i>	<i>mitodes</i> (P3)					*					
Myrtaceae	<i>Verticordia</i>	<i>picta</i>		*								
Myrtaceae	<i>Verticordia</i>	<i>plumosa</i>		*								
Myrtaceae	<i>Verticordia</i>	<i>plumosa</i> var. <i>incrassata</i>	*	*			*					
Myrtaceae	<i>Verticordia</i>	<i>roei</i>	*	*								
Olacaceae	<i>Olax</i>	<i>benthamiana</i>		*								
Poaceae	<i>Austrostipa</i>	<i>hemipogon</i>						*				
Poaceae	<i>Austrostipa</i>	<i>pynostachya</i>			*							
Poaceae	<i>Enteropogon</i>	<i>acicularis</i>		*								

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Polygalaceae	<i>Comesperma</i>	<i>volubile</i>									*	
Potamogetonaceae	<i>Lepilaena</i>	<i>preissii</i>							*			
Pottiaceae	<i>Barbula</i>	<i>calycina</i>				*						
Proteaceae	<i>Adenanthos</i>	<i>pungens</i>					*					
Proteaceae	<i>Adenanthos</i>	<i>argyreus</i>		*								
Proteaceae	<i>Banksia</i>	<i>cirsiioides</i>	*	*			*		*			
Proteaceae	<i>Banksia</i>	<i>elderiana</i>					*		*			
Proteaceae	<i>Banksia</i>	<i>erythrocephala</i>	*	*			*					
Proteaceae	<i>Banksia</i>	<i>laevigata</i>					*					
Proteaceae	<i>Banksia</i>	<i>laevigata</i> subsp. <i>fuscolutea</i>	*	*								
Proteaceae	<i>Banksia</i>	<i>laevigata</i> subsp. <i>laevigata</i>		*								
Proteaceae	<i>Banksia</i>	<i>violacea</i>	*	*								
Proteaceae	<i>Conospermum</i>	<i>brownii</i>	*	*			*		*			
Proteaceae	<i>Grevillea</i>	<i>acuaria</i>	*	*	*	*	*	*	*		*	*
Proteaceae	<i>Grevillea</i>	<i>cagiana</i>	*	*			*		*		*	
Proteaceae	<i>Grevillea</i>	<i>eriostachya</i>	*	*	*				*			
Proteaceae	<i>Grevillea</i>	<i>eryngioides</i>	*	*	*							
Proteaceae	<i>Grevillea</i>	<i>excelsior</i>		*								
Proteaceae	<i>Grevillea</i>	<i>huegelii</i>	*	*	*			*	*	*	*	
Proteaceae	<i>Grevillea</i>	<i>integrifolia</i>	*									
Proteaceae	<i>Grevillea</i>	<i>obliquistigma</i>		*								
Proteaceae	<i>Grevillea</i>	<i>oncogyne</i>	*	*	*			*	*			
Proteaceae	<i>Grevillea</i>	<i>pterosperma</i>	*	*	*							
Proteaceae	<i>Grevillea</i>	<i>shuttleworthiana</i> subsp. <i>obovata</i>		*			*					
Proteaceae	<i>Hakea</i>	<i>corymbosa</i>	*	*			*		*		*	*
Proteaceae	<i>Hakea</i>	<i>cygna</i> subsp. <i>cygna</i>	*	*								
Proteaceae	<i>Hakea</i>	<i>erecta</i>	*	*								
Proteaceae	<i>Hakea</i>	<i>francisiana</i>	*									
Proteaceae	<i>Hakea</i>	<i>incrassata</i>					*					
Proteaceae	<i>Hakea</i>	<i>multilineata</i>	*	*	*							

Family	Genus	Species	Open shrub mallee of <i>E. eremophila</i> & <i>E. pileata</i> over low heath of mixed <i>Acacia/Melaleuca</i>	Heath of mixed <i>Acacia/Allocasuarina/ Melaleuca</i>	Open shrub mallee of <i>E. eremophila</i> / <i>E. calycogona</i> / <i>E. celastroides</i> over low heath of mixed <i>Melaleuca</i>	Low woodland of <i>E. salomonophloia</i> over low scrub of mixed <i>Melaleuca</i>	Low scrub of mixed <i>Allocasuarina</i> over mixed dwarf scrub	Low woodland of <i>E. salomonophloia</i> over mallee of <i>E. cylindrocarpa</i> , <i>E. cylindriflora</i> and <i>E. pileata</i>	Heath of <i>Melaleuca hamata</i> / <i>Allocasuarina acutivalvis</i> over dwarf scrub of <i>Microcybe multiflora</i>	Regrowth forest of <i>E. salomonophloia</i> / <i>E. salubris</i> over heath of <i>Melaleuca cucullata</i> / <i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i> and open dwarf scrub of <i>Wilsonia humilis</i> / <i>Acacia acanthoclada</i>	Low woodland of <i>E. polita</i> / <i>E. platycorys</i> / <i>E. horistes</i> over low heath of <i>Melaleuca hamata</i> and dwarf scrub of <i>Microcybe multiflora</i> / <i>Acacia intricata</i>	Open tree mallee of <i>E. eremophila</i> over low scrub of <i>Melaleuca hamata</i> on stony rise
Proteaceae	<i>Hakea</i>	<i>newbeyana</i>	*	*								
Proteaceae	<i>Hakea</i>	<i>platysperma</i>		*			*		*			
Proteaceae	<i>Hakea</i>	<i>scoparia</i>	*	*			*		*		*	*
Proteaceae	<i>Hakea</i>	<i>subsulcata</i>		*	*		*					
Proteaceae	<i>Isopogon</i>	<i>axillaris</i>		*								
Proteaceae	<i>Isopogon</i>	<i>scabriusculus</i> subsp. <i>pubifloris</i>		*	*				*			
Proteaceae	<i>Isopogon</i>	<i>scabriusculus</i> subsp. <i>stenophyllus</i>		*								
Proteaceae	<i>Isopogon</i>	<i>teretifolius</i>		*								
Proteaceae	<i>Persoonia</i>	<i>coriacea</i>	*	*	*							
Proteaceae	<i>Persoonia</i>	<i>helix</i>		*	*		*					
Proteaceae	<i>Persoonia</i>	<i>trinervis</i>			*							
Proteaceae	<i>Petrophile</i>	<i>divaricata</i>	*	*	*		*				*	
Proteaceae	<i>Petrophile</i>	<i>ericifolia</i>	*	*								
Proteaceae	<i>Petrophile</i>	<i>squamata</i>	*	*	*		*					
Proteaceae	<i>Petrophile</i>	<i>stricta</i>		*								
Proteaceae	<i>Petrophile</i>	<i>teretifolia</i>	*	*								
Proteaceae	<i>Petrophile</i>	<i>trifida</i>		*								
Proteaceae	<i>Synaphea</i>	<i>interioris</i>									*	
Restionaceae	<i>Stenotalis</i>	<i>ramosissima</i>		*								
Rhamnaceae	<i>Cryptandra</i>	<i>minutifolia</i> subsp. <i>minutifolia</i>	*	*	*							
Rhamnaceae	<i>Cryptandra</i>	<i>myriantha</i>						*	*		*	
Rhamnaceae	<i>Spyridium</i>	<i>mucronatum</i> subsp. <i>mucronatum</i>	*									
Rutaceae	<i>Boronia</i>	<i>westringioides</i> (P2)		*			*					
Rutaceae	<i>Drummondita</i>	<i>hassellii</i>		*					*			
Rutaceae	<i>Microcybe</i>	<i>albiflora</i>		*								
Rutaceae	<i>Microcybe</i>	<i>multiflora</i>					*		*	*	*	
Rutaceae	<i>Phebalium</i>	<i>ambiguum</i>		*					*		*	
Rutaceae	<i>Phebalium</i>	<i>filifolium</i>	*	*	*				*		*	
Rutaceae	<i>Phebalium</i>	<i>tuberculosum</i>		*								
Rutaceae	<i>Phebalium</i>	aff. <i>lepidotum</i>					*					

Appendix 5: DEC Threatened Flora Database search results within 10km of the Greater Flying Fox area (DEC, 2011b)

Species	Conservation Code
<i>Banksia sphaerocarpa</i> var. <i>dolichostyla</i>	T
<i>Eucalyptus steedmanii</i>	T
<i>Paragoodia crenulata</i>	T
<i>Acacia asepala</i>	2
<i>Acacia kerryana</i>	2
<i>Austrostipa</i> sp. Mt Holland (W.A. Thompson & J. Allen 948)	1
<i>Baeckea</i> sp. Blue Haze Mine (P. Armstrong 06/910)	1
<i>Baeckea</i> sp. Crossroads (B.L. Rye & M.E. Trudgen 241186)	1
<i>Baeckea</i> sp. Hatter Hill (K.R. Newbey 3284)	3
<i>Baeckea</i> sp. Lake Cronin (K.R. Newbey 9191)	1
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	2
<i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968)	3
<i>Bentleya diminuta</i>	2
<i>Boronia westringioides</i>	2
<i>Brachyloma nguba</i>	1
<i>Calamphoreus inflatus</i>	4
<i>Comesperma calicola</i>	3
<i>Conospermum sigmoideum</i>	2
<i>Cryptandra polyclada</i> subsp. <i>polyclada</i>	3
<i>Dampiera scaevolina</i>	1
<i>Daviesia elongata</i> subsp. <i>implexa</i>	3
<i>Dillwynia acerosa</i>	3
<i>Dillwynia</i> sp. Capel (P.A. Jurjevich 1771)	1
<i>Elatine macrocalyx</i>	3
<i>Eremophila biserrata</i>	4
<i>Eremophila racemosa</i>	4
<i>Eucalyptus exigua</i>	3
<i>Eucalyptus georgei</i> subsp. <i>fulgida</i>	4
<i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>	1
<i>Eutaxia acanthoclada</i>	3
<i>Eutaxia nanophylla</i>	3
<i>Eutaxia rubricarina</i>	3
<i>Frankenia drummondii</i>	3
<i>Gastrolobium tenue</i>	1
<i>Gnephosis intonsa</i>	1
<i>Grevillea pilosa</i> subsp. <i>redacta</i>	3
<i>Grevillea prostrata</i>	4
<i>Guichenotia asteriskos</i>	2
<i>Haegiela tatei</i>	4
<i>Hibbertia pachyphylla</i>	3
<i>Isolepis australiensis</i>	3
<i>Keraudrenia adenogyna</i>	3
<i>Melaleuca macronychia</i> subsp. <i>trygonoides</i>	3
<i>Microcorys</i> sp. Forrestania (V. English 2004)	4

Species	Conservation Code
<i>Mirbelia densiflora</i>	3
<i>Olearia laciniifolia</i>	2
<i>Pityrodia</i> sp. Yilgarn (A.P. Brown 2679)	3
<i>Pultenaea daena</i>	3
<i>Scaevola tortuosa</i>	1
<i>Stylidium sejunctum</i>	2
<i>Stylidium validum</i>	1
<i>Verticordia gracilis</i>	3
<i>Verticordia multiflora</i> subsp. <i>solox</i>	2

Appendix 6: GPS coordinates of Flora/Fauna of Conservation Significance within the Greater Flying Fox area

Species	DEC Location	Zone (GDA94)	Easting	Northing
<i>Baeckea</i> sp. North Ironcap (R.J. Cranfield 10580)	Y	50H	754868	6410532
<i>Baeckea</i> sp. Parker Range (M. Hislop & F. Hort MH 2968) (P1)	Y	50 H	753722	6409262
<i>Boronia westringioides</i> (P2)	Y	50H	752750	6410846
<i>Boronia westringioides</i> (P2)	N	50 H	752529	6411741
<i>Boronia westringioides</i> (P2)	Y	50 H	752747	6410284
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	N	50H	752426	6412067
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	Y	50H	752518	6411980
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	Y	50H	753456	6410860
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	N	50 H	752585	6411629
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	N	50 H	752701	6410935
<i>Daviesia elongata</i> subsp. <i>implexa</i> (P3)	N	50 H	752879	6410774
<i>Dillwynia acerosa</i> (P3)	Y	50H	753593	6410373
<i>Eutaxia acanthoclada</i> (P3)	N	50 H	754074	6412170
<i>Eutaxia acanthoclada</i> (P3)	N	50 H	753959	6412174
<i>Eutaxia acanthoclada</i> (P3)	N	50 H	754149	6412370
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	754349	6408472
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752970	6408129
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753082	6408074
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	754608	6408424
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753995	6411261
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	Y	50H	754547	6410246
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752650	6407978
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752899	6408330
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752941	6408214
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753010	6408217
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753038	6408217
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752916	6408111
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752952	6408111
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753011	6408101
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753065	6408093
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752700	6407982
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752812	6407983
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752856	6407979
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752894	6407979
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752995	6407975
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753143	6407859
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	753021	6407855
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752988	6407852
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752918	6407854
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752701	6407849
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752668	6407849
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752643	6407848
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752610	6407850
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752544	6407848
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752284	6407845
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752515	6407853
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	752521	6407982
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50 H	753082	6408074
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50H	754796	6409814
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50 H	753760	6408472
<i>Microcorys</i> sp. Forrestania (V. English 2004) (P4)	N	50 H	752425	6408245
<i>Verticordia mitodes</i> (P3)	N	50 H	752901	6410561
Malleefowl mound (inactive)	N/A	50H	753304	6407841

Appendix 7: Muir Life Form/Height Class (Muir, 1977).

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70% -100%	MID DENSE 30% -70%	SPARSE 10% -30%	VERY SPARSE 2% -10%
Trees > 30m Trees 15 – 30m Trees 5 – 15m Trees < 5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
Mallee Tree Form Mallee Shrub Form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs > 2m Shrubs 1.5 – 2m Shrubs 1 – 1.5m Shrubs 0.5 – 1m Shrubs 0 – 0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
Mat Plants Hummock Grass Bunch grass >0.5m Bunch grass < 0.5m Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-dense Hummock Grass Tall Grass Low Gras Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
Sedges > 0.5m Sedges < 0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
Ferns Mosses, liverworts	Dense ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

Appendix 8: Keighery Health rating scale (1994).

Health Rating	Health Description	Definition
6	Pristine	No obvious signs of disturbance
5	Excellent	Vegetation intact despite disturbance affect, weeds are non-aggressive individual species
4	Very Good	Vegetation altered due to obvious signs of disturbance
3	Good	Structure affected multiple disturbances. Retains basic structure, has ability to regenerate
2	Degraded	Structure severely disturbed. Can regeneration to good condition, but requires intensive management
1	Completely Degraded	Completely bare no native species